

12-13-2017

Reborn of the Beauty

Ting Hsuan Tsao
tt6721@rit.edu

Follow this and additional works at: <https://scholarworks.rit.edu/theses>

Recommended Citation

Tsao, Ting Hsuan, "Reborn of the Beauty" (2017). Thesis. Rochester Institute of Technology. Accessed from

This Thesis is brought to you for free and open access by the Thesis/Dissertation Collections at RIT Scholar Works. It has been accepted for inclusion in Theses by an authorized administrator of RIT Scholar Works. For more information, please contact ritscholarworks@rit.edu.

REBORN OF THE BEAUTY

Ting Hsuan Tsao

Thesis Documentation for the Master of Fine Arts Degree

Rochester Institute of Technology
College of Imaging Arts and Sciences
School of Design
MFA Visual Communication Design
December 13th, 2017

Thesis Committee Approval

Chief Thesis Adviser
Daniel DeLuna, Associate Professor
Visual Communication Design

Signature of Chief Thesis Adviser

Date

Associate Thesis Adviser
Shaun Foster, Associate Professor
Visual Communication Design

Signature of Associate Thesis Adviser

Date

Associate Thesis Adviser
Chris Jackson, Associate Dean
Visual Communication Design

Signature of Associate Thesis Adviser

Date

MFA Thesis Candidate
Ting Hsuan Tsao

Signature of MFA Thesis Candidate

Date

Table of Contents

Abstract	4
Introduction	5-6
Problem Statement	5
Inspiration	6
Review of Literature	7-11
Design	7-8
Technology	9-10
Subject Matter	11
Process	12-43
Pattern Design Process	12-15
Modeling Taiwanese Houses	16-23
Modeling Mixed Culture Architecture	24-29
Particles and Dynamics Process	30-34
Texture Design Process	35-38
Light and Color Management	39
Problems and Solutions	40-43
Summary	44
Audience Feedback and Revision	
Conclusion	
Appendix	45
Thesis Proposal	46-58
Bibliography	59-60

Abstract

Nowadays, 3D techniques play an important role in the reproduction of history and culture on screen. Modeling and 3D visual effects, using technical tools and other computer methods to achieve high returns from the movie industry, have become prominent in today's technological trends.

Taiwan has always been identified as a province of China. The island nation, however, has its own unique culture and history. With the growing number of people emigrating to Taiwan annually, the opportunity to share our story has grown as well. In this regard, the 3D technique offers useful ways to bring the past back to life, discover the identity of a place, and tell a country's unique story.

This thesis project is a 240-second film created by using the 3D application Autodesk Maya and the visual application Adobe Photoshop, Illustrator and After Effects. The film shows the real beauty of Taiwan and its unique architecture.

Introduction

Most of the time when people hear of Taiwan, they think of China. Taiwan and China are easily associated with each other, and people do not often see the difference between the two countries. This may be due to the features of traditional housing, which unfortunately have been destroyed during the wars, leaving only images in books or the hand drawings in the local museum. It is rather difficult for people who are not familiar with our culture and language to notice the uniqueness of our architectural style.

This thesis project emanates from these questions I ask myself: Can 3D modeling provide a way to bring the past back to life? Can I use 3D techniques to educate others about my culture and help our people realize the importance of preserving and maintaining our traditions by converting my project into educational materials?

As a graphics designer, my workflow consists of transforming housing structure sketches to a concept design, turning words to visualization, and creating final 3D models. The results can directly be used as educational material for people who want to learn more about our traditions.

Problem Statement

In the past, historical records were kept in the form of black and white photography and printed documents. Documenting our past required someone reliable and accurate to ensure that our history and culture are not easily lost or forgotten. Films that reenacted historical events accomplished this, but they do not afford the viewers any sensation of nor a deeper look at architecture at that time.

Though we take history courses, we seldom learn the importance of protecting, preserving, and studying our own culture. Even the Taiwanese people are often confused about the difference between the Chinese and Taiwanese architectural styles, or even Japanese architecture that has been integrated in our culture.

Ages throughout, to best showcase the history of Taiwanese architecture, I have chosen to use 3D techniques because information about architecture after the Sino-Japanese war that took place during the Second World War is particularly scant. Information about architecture are usually available in the form of photographs and buildings for tourists; many locations, however, can be recreated using 3D techniques. As such, I utilized 3D visual effects in this project to show the destruction during the war.

Inspiration

Right from the beginning, I wanted to create a realistic and detailed environment with a mixed atmosphere for this thesis project. I found that many games and movies use the Asian style, and I was rather amazed by the beauty of our civilization and by the willingness of people to learn about the Asian culture. I started reading and collecting books and movies that represent our traditions, and I discovered that Taiwan, a country that is full of beautiful landscapes, is unfortunately not as well known as I thought. Therefore, I saw this as an opportunity to educate others about the history and culture of Taiwan so as to preserve parts of our history that may have been forgotten.

I took a trip to Taiwan to visit the local museums and bookstores for more reference and resources. I was able to find some movies, which have the same background and timing as the project I intend to execute. However, many of these important videos and documentaries are not available online or in other languages; they do not seem to have an audience outside of Taiwan. Nevertheless, I was encouraged by video games like Assassin's Creed Chronicles China and Shadow Warrior, which showcased the architecture and the style I was aiming for with my project. Consequently, these provided me with fresh ideas as to how other people perceive the Asian culture and from which point of view I could capture an audience. Ultimately, these inspired me even more to proceed with the project.

Review of Literature

Design

The Architecture Reference & Specification Book

by Julia Morrough
August 1, 2013

This is the first book I have used for architecture design research. It contains detailed information on materials, structures, and sizes of most of the architectural designs we commonly see, and this has helped me with my 3D gray box modeling process. Overall, it is a valuable reference book.

臺北城-城內篇：你不知道的老建築、古早味60選

(Taipei Town, in-town Series: The Traditional Architecture and 60 Authentic Food You Don't Know About)

by Fu Yu
Tian Xia Culture Published August 31, 2016

This book is a compilation of different illustrations and artworks seen in ancient Taiwan. The book provides vivid details as to how people have built their houses and where they have obtained ideas for house design. The book features various houses, streets, stores, train stations, local schools, and night markets. This book has offered me a clear idea on the right proportions of traditional Taiwanese houses. Before creating the storyboard, I have to understand the overall historical background of Taiwan and this book presents a complete timeline of historical events.

101 Things I Learned in Architecture School

by Matthew Frederick
MIT Press Published August 31, 2007

This is a book used by students of architecture, and I have studied this book to understand how housing structures work from an architectural perspective. Before I started modeling for my thesis project, I studied the proper size and proportion of architecture from this book, and it helped me create the 3D models as accurately as possible.

Mastering Autodesk Maya 2016

By Todd Palamar
Autodesk Official Press Published 2016

Mastering Autodesk Maya covers modeling, texturing, lighting, 3D visual effects, and rendering. Every chapter presents detailed examples. Information and practices are readily available by using key words.

Design

台灣古建築裝飾圖鑑 (Ancient Architectural Decoration in Taiwan)

By Kang Si

The Owl Published April 2012

This is the first book in Taiwan to introduce traditional architectural decoration through illustrations. The most common decorative themes are divided into six categories: animals, plants, patterns, texts, utensils, and figures. Selected works from the provinces and various master craftsmen and local housing decoration designers, furnish readers an understanding of the most gorgeous traditional architecture of the country.

台灣古建築圖解事典 (Taiwan Ancient Architectural Illustration Book)

By Chien-Lang, Lee

Far Rive Press Published 2003

This book includes four major styles of ancient architecture in Taiwan: traditional Chinese, modern Taiwanese architecture, Japanese architectural style, and aboriginal building style. The book contains over 1,000 images of traditional architecture and historical events all over Taiwan. The foundation of my thesis is partially based on the photographs in this book.

古蹟入門 (Introduction of Monuments)

By Chien-Lang, Lee

Far Rive Press Published 1999

The book is divided into four sections: observation, knowledge, arranging, and appendix. This book focuses on observations and covers all types of monuments in Taiwan, including castles, ancestral temples, Confucian temples, schools, houses, street houses, gardens, archways, tombs, forts, lighthouses, museums, government offices, railway stations, banks, schools, hospitals, courts, and aboriginal settlements. This book even shows the structure and materials of each historical architecture.

台北故事遊: 古蹟、老街、老店&新空間

(Taipei Stories- Monuments, Traditional Streets, Traditional Stores and Modern Space)

By Shung Chi Culture Editorial Office

Shung Shi Press Published 2013

This book highlights all types of historical hot spots in Taiwan, bringing back the value and historical stories of all monuments, local coffee shops, old apartment, temples, parks and memorial halls, and traditional houses. This book also explains why and how local art workers, along with the government, have repaired and restored some valuable buildings that have been partially destroyed and abandoned after the war. These efforts have made people realize the importance of maintaining historical monuments.

Technology

Exterior Rendering Techniques with mental ray and Maya

by Kyle Green

<https://creative.pluralsight.com/tutorial/634-Exterior-Rendering-Techniques-with-mental-ray-and-Maya>

This series of tutorials discuss the various tools, techniques, and procedures for outdoor lighting in MAYA. The tutorials cover the whole category on gamma-correcting and linear workflow on 3D texture and materials within MAYA and explains how it works and how to resolve errors. Through the tutorials, I learned about how to control basic settings to simulate physically accurate lighting for photo realistic scene in 3D and how to work on the final touch through Photoshop.

Mastering Displacement Maps in MAYA

by Kyle Green

<https://creative.pluralsight.com/tutorial/661-Mastering-Displacement-Maps-in-Maya>

Displacement maps play an important role in the modeling process. In this tutorial, I learned how to efficiently modify a displacement map and render it with high-detailed surfaces. I also learned the difference between using simple sculpting and using the displacement map, which not only saves on render time but also creates better quality scenes for my project.

Using HDR Images for 3D Lighting in Maya

by Jon Tojek

<https://creative.pluralsight.com/tutorial/599-Using-HDR-Images-for-3D-Lighting-in-Maya>

This tutorial is a useful guide for using high dynamic range (HDR) panoramic images for lighting in Maya and mental ray. One of the most common ways I use to create lighting was through physical sun and sky. However, my advisors have observed that such lighting is not realistic enough. While searching for a solution, I found this tutorial, which provided me all the information on setting up physically based lighting, world scene scale, color management, proper render preview, and linear color images. Learning for the lessons in this tutorial, the color and overall atmosphere of my project looks much smoother. .

Technology

Simulating a Volcano Blast in Maya

by Pankaj Malik

<https://creative.pluralsight.com/tutorial/1877-Simulating-a-Volcano-Blast-in-Maya>

One of my goals for this project is to create 3D fluids and particles. Throughout the lesson, I have learned about the important attributes of fluids to be able to simulate volcanic force. The tips and tricks on how to quickly resolve errors and instability while handling large amount of fluids have been beneficial particularly when I was trying to make other types of fluid simulations. Although this lesson is about how to create volcanic eruptions, the same ideas can be applied to other 3D particle effects.

Using Advanced Compositing Tools in After Effects

by Michael Raphaelovich

<https://creative.pluralsight.com/tutorial/1931-Using-Advanced-Compositing-Tools-in-After-Effects>.

This lesson mainly focuses on how to utilize the green screen's red, green, blue (RGB) information in order to pull extra keys and how to make compositing easier for beginners. Even though the project does not focus on using the green screen, I still learned some valuable tips on compositing techniques, workflow and procedures that are useful for the project's after effects.

Maya Studio Projects Texturing and Lighting

By Michael McKinley

Published by Sybex, May 31, 2011

This book focuses entirely on practical projects that demonstrates how to use Maya's texturing and lighting tools in real-world situations. This book provides both basic and advanced information on Maya. It is the official book on Autodesk Maya and it covers almost all of the lessons about the software. The examples in the book are highly detailed, which helped me improve my skills in 3D texturing and lighting.

Subject Matter**The Fortunate Dimensions of Taiwanese Traditional Architecture**

By Krishnamurti R Chiou

Research Article Published May 1995

<http://repository.cmu.edu/cgi/viewcontent.cgi?article=1021&context=architecture>

The relationship between China and Taiwan is confusing to many people. Both countries seem to have similarities in language, food, and clothes, as well as in architectural styles, structures, and ideas. However, this research article points out some significant differences and origins based on the studies conducted on historical literature. In addition, the article provides architectural images for comparison, which afforded me a better understanding of the evolution of architecture in both China and Taiwan.

Travel in Taiwan

By Arcspace

Travel Journal Published Feb 2015

<https://arcspace.com/travel/travel-guide-taiwan/>

Taiwan's architectural designs are extremely diverse, which includes its traditional architecture style and those that show a mixture or an integration of Japanese and Western architectural features. This journal contains images of Taiwanese architecture dating back to 1919 in comparison with modern architecture. The stories behind each architectural design provides insights on their uniqueness and how important it is to preserve the monuments.

台灣建築史 (History of Taiwanese Architecture)

By Chien-Lang, Lee

Wu Nan Press Published 2008

This book provides a clear and descriptive timeline of Taiwanese architecture, from the earliest human settlements in Taiwan during the prehistoric times to the beginning of the 20th century. The book contains stories on Taiwanese traditions, the colonial time, and the impact of colonization. The book concurs that architecture reflects the history of human life and culture. The author documented more than 100 buildings and provided detailed information on all traditional architectures. The book features detailed illustrations of local houses, religious buildings, such as churches and temples, government institutions, Han Chinese traditional houses, prehistoric stone houses, Japanese-style buildings and modern 20th century architecture.

Pattern Design Process

Research on Taiwanese traditional houses revealed its complex structure and detailed pattern that makes the country's culture special and unique. These intricate patterns are found everywhere, including walls, pillars, and even windows. They were integrated into windows because of the summer weather in Taiwan, which is mostly hot and humid. By incorporating these carved-out patterns on walls and creating skeleton windows, they were not only able to isolate the two spaces, but also allowed wind to come through.

I studied the different parts and aspects of Taiwanese houses, landmarks, and exhibition designs as I endeavor to create them in 3D to allow people to see the real beauty of our craft on these structure. I conducted a research on our traditional art and patterns. The traditional houses and decoration are relatively complicated in terms of structure and design, but once I have created the overall graphics, I am able to show the audience the right atmosphere.



(Fig. 1) Window Decoration Reference

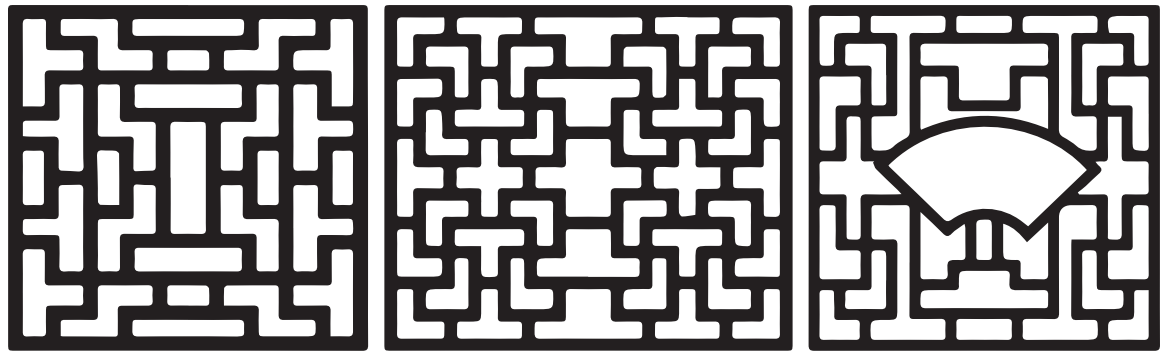


(Fig. 2) Window Decoration Reference

After collecting enough reference for the traditional Taiwanese houses, I narrowed down the patterns to the most common designs that I wanted to show. I created sketches of the patterns and made them into vector graphics in Illustrator before converting them into 3D models. I wanted to preserve the decorations as close to the original as possible, so I selected a few significant landmarks as reference for modeling.

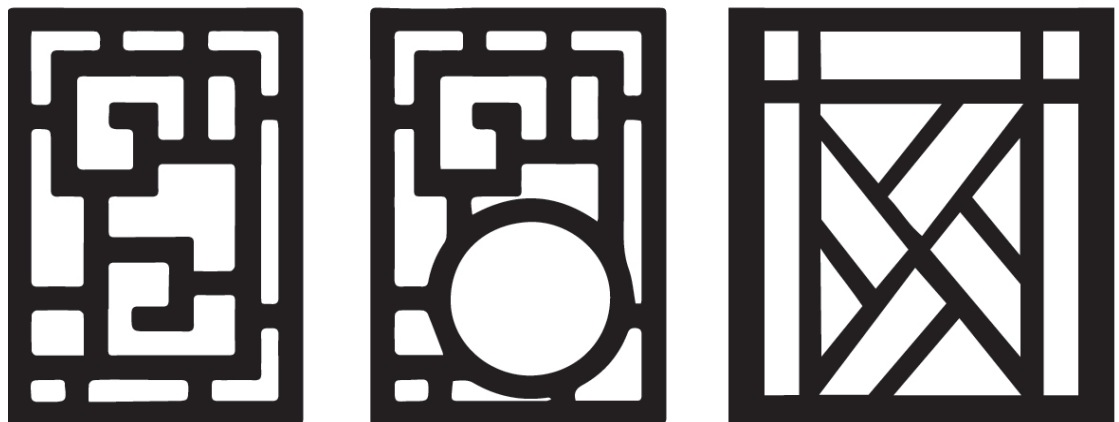
Pattern Design Process

As stated earlier, I wanted to showcase traditional houses and show the patterns in them. In this regard, I created the vector images on Adobe Illustrator, saved as Illustrator 8.0, then imported the 2D graphics into Autodesk Maya, using minimum poly counts for faces, and finally extruded them into 3D models.



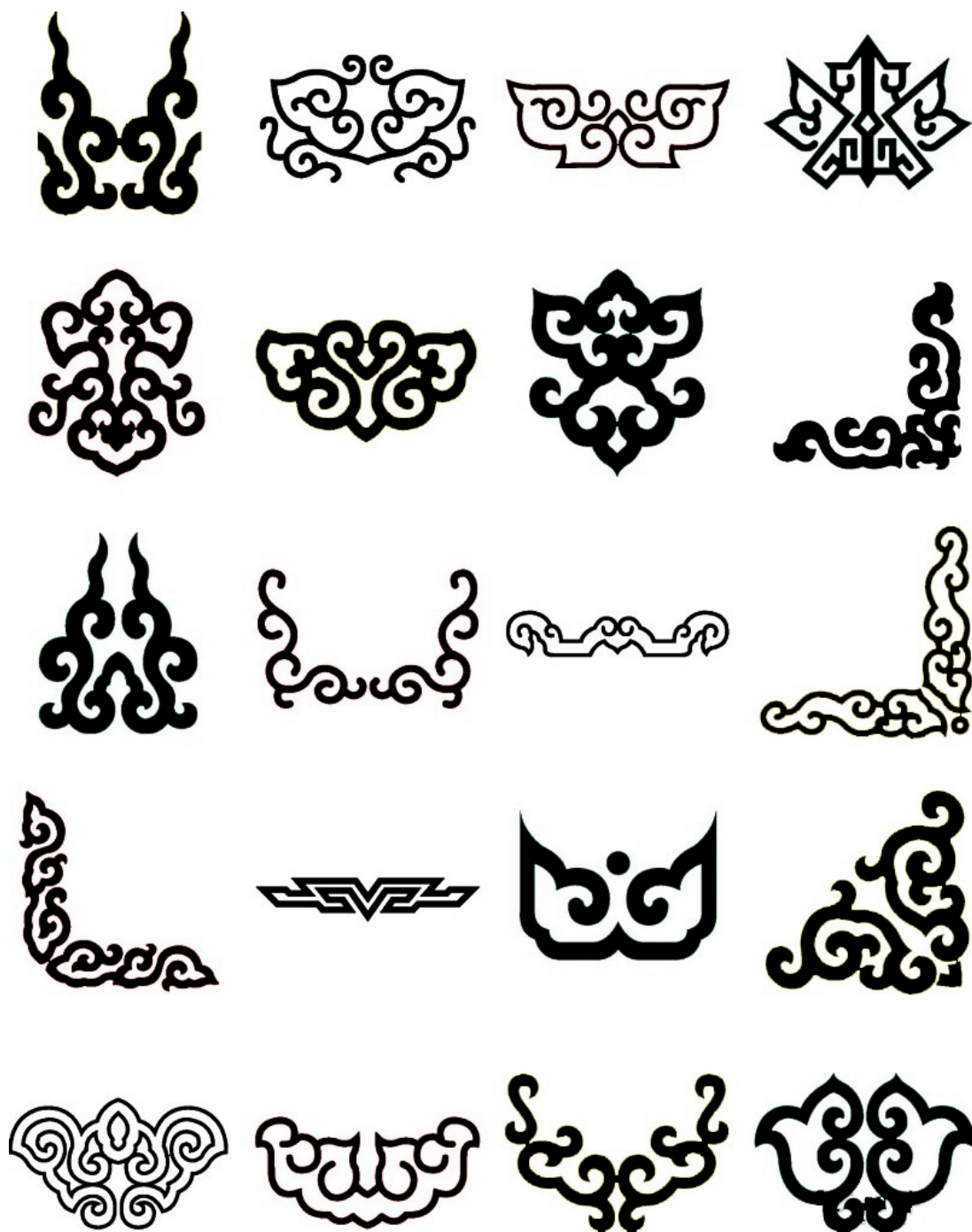
*(Fig. 3) Scene 1. Main House
Window Decoration
Adobe CC Illustrator*

To preserve the highly detailed quality of my project, I devised my own arrangement in putting significant pieces together. In addition, I wanted consistency of style in my project, which means that the patterns in one scene have to match others when they belong to the same time period. Sometimes, the patterns on the wall are completely different from the ones on the pillars; therefore, the meaning behind them can be considerably different. As such, I could not arrange them randomly.



*(Fig. 4) Scene 1. Main Street Light
Pillars Decoration
Adobe CC Illustrator*

Pattern Design Process



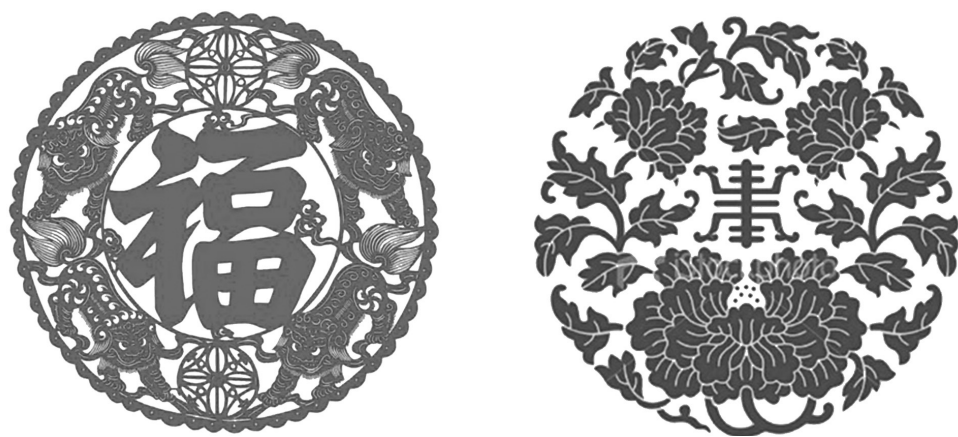
(Fig. 5) Scene 1. Main Street Light/Top Roof
Wall Decoration
Adobe CC Illustrator

Pattern Design Process

In Taiwan, the motivation for creating outdoor decoration is not just based on its beauty but also on its meaning. People believe that some patterns are symbolic of hope, good fortune, wealth, and protection from evil. Every region has its own iconic symbol. To this day, people continue using these patterns for special occasions. In fact, there is a saying affirming that “the value of the house depends on how magnificent it’s pattern decoration look.”



(Fig 6) Scene 1,2. Main House Wall
Wall Couplets Decoration Reference
Adobe CC Illustrator



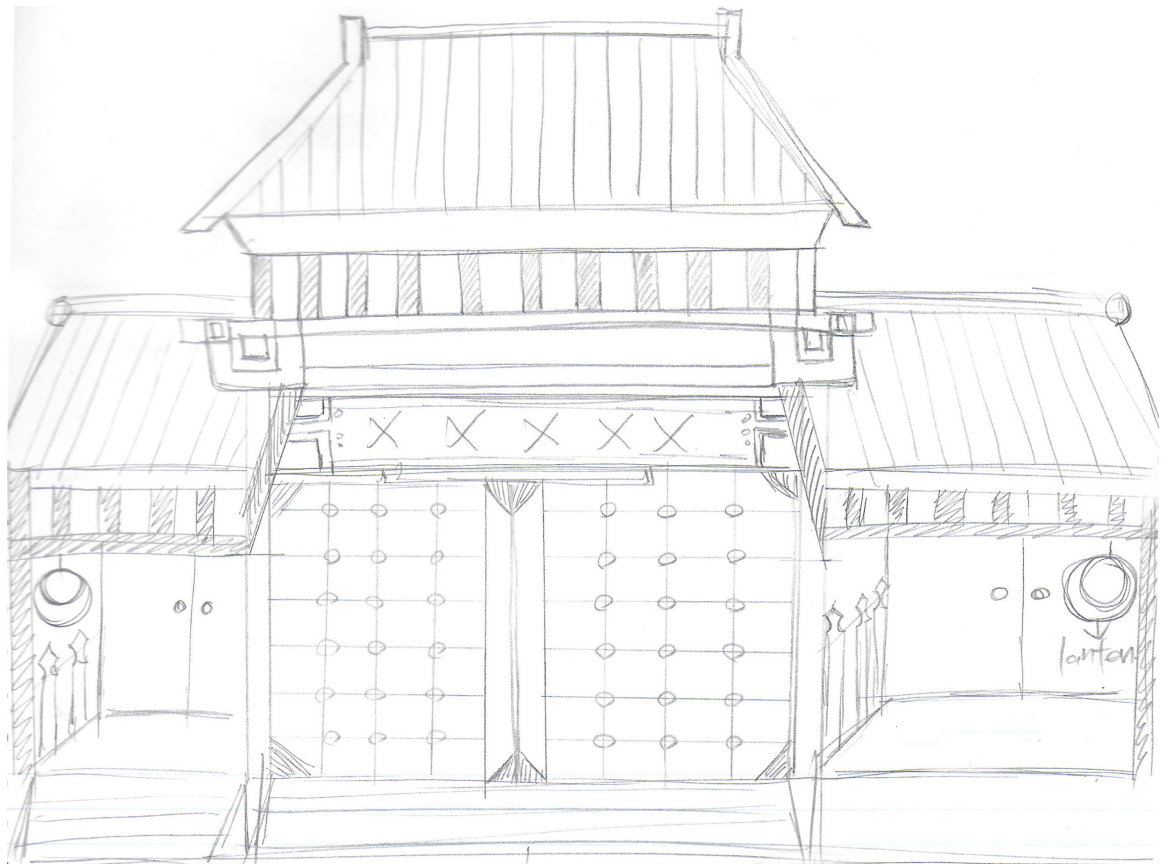
(Fig 7) Scene 1. Market Store
Wall Couplets Decoration Reference
Adobe CC Illustrator

Modeling Taiwanese Houses

The purpose of my thesis project is to preserve the traditional Taiwanese architecture. To be consistent with the architecture of that time period, the scale has to match real-life traditional housing. Due to the lack of documentation online and in libraries overseas, I have to research books on Taiwan and even travel to there to visit local museums and temples to collect more reliable information. After finalizing the ground plan, I started comparing the hand-drawing houses in books and the architecture scale rules in order to generate correct proportions.

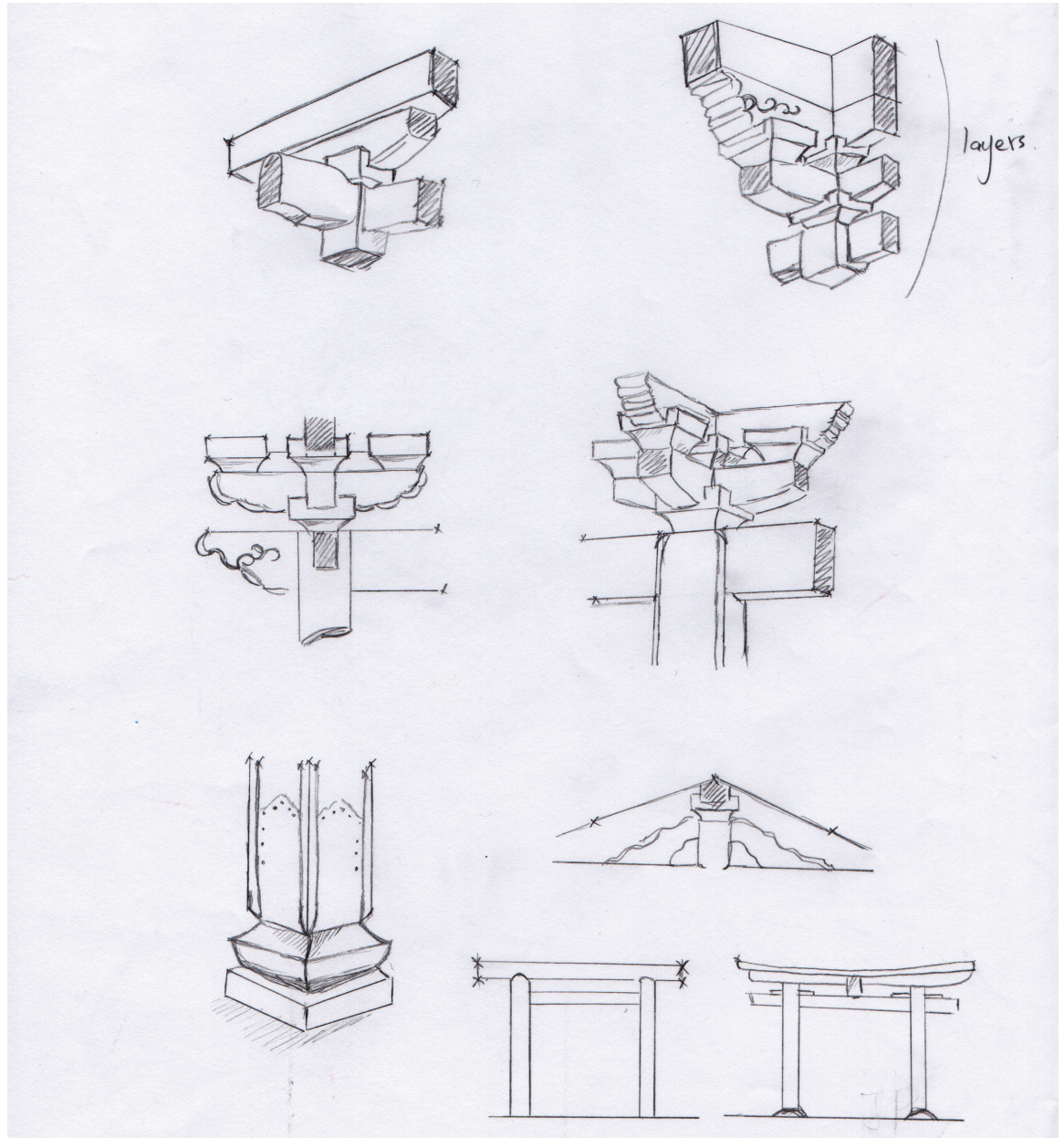
It was, and still is, believed that properly determined orientations, heights, widths, and depths bring good fortune. Accordingly, in Taiwanese traditional architecture, almost all measurements are directly related to the three basic dimensions of the central space. These numbers are referred to as the fortunate dimensions.

Before I began modeling, I focused on the layout, designs, and materials of significant landmarks and architectural icons of Taiwan. In modeling these structures, I wanted to ensure that my recreations of traditional Taiwanese architecture is as accurate as possible as regards proportions and layout.



*(Fig. 8) Scene 1. Residential Area
Housing Design Sketch*

Modeling The Taiwanese Houses



(Fig. 15) Scene 2,3 Houses Structure Sketches

Modeling The Taiwanese Houses



*(Fig. 9) Scene 1. Main Entrance
Main Gate Design Reference
Taipei, Taiwan*



*(Fig. 10) Scene 1. Market Place
Traditional Taiwanese Market Reference
Jiuken, Taipei, Taiwan*



*(Fig. 11) Scene 1. Market Place
Taiwanese Residential Houses Reference
Taipei, Taiwan*



*(Fig. 12) Scene 1. Market Store
Taiwanese Entrance Gate Reference
Hengchun, Taiwan*



*(Fig. 13) Scene 2. Main Housing Area
General Housing Gate Design Reference
Tainan, Taiwan*



*(Fig. 14) Scene 2. Main Housing Area
General Housing Design Reference
Pintong City, Taiwan*

Modeling The Taiwanese Houses

After planning out the arrangement of the scenes, I began modeling the outline of the houses based on the ground plans, and added on more details and the patterns.

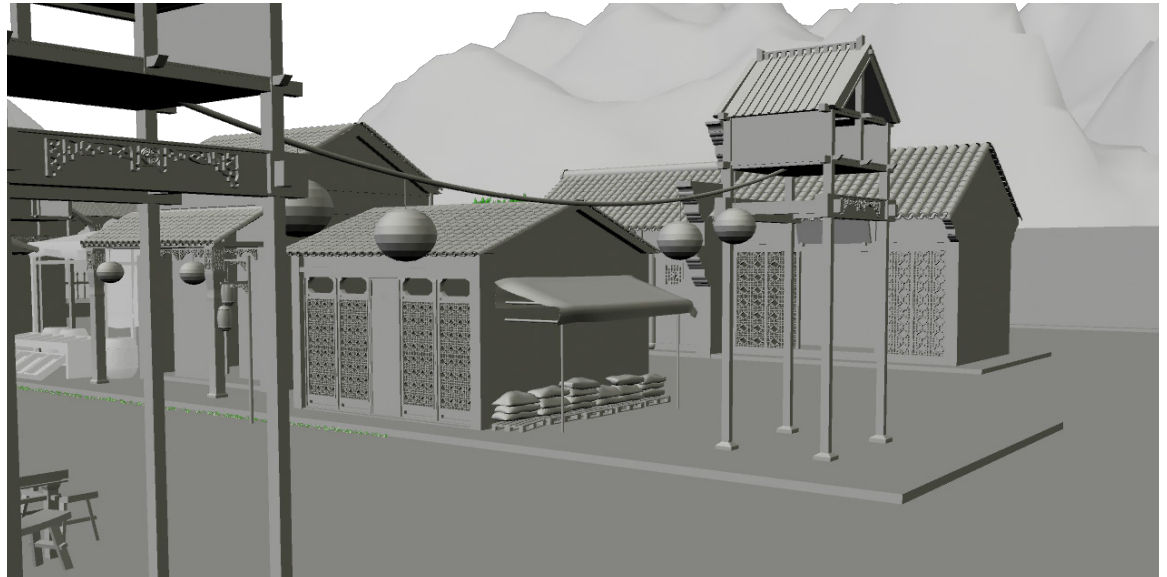


*(Fig 16) Scene 2, Gate Entrance Design
3D Modeling, Gray Box
Autodesk Maya*



*(Fig 17) Scene 1, Main Entrance Gate
3D Modeling/Pattern, Gray Box
Autodesk Maya*

Modeling The Taiwanese Houses



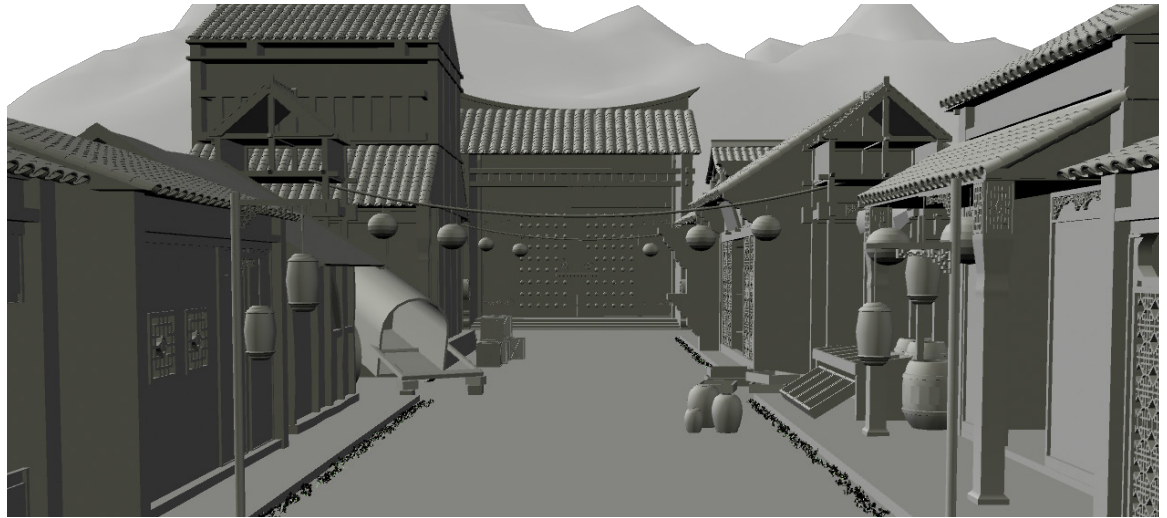
*(Fig 18) Scene 1, Main Scene House
3D Modeling, Gray Box
Autodesk Maya*



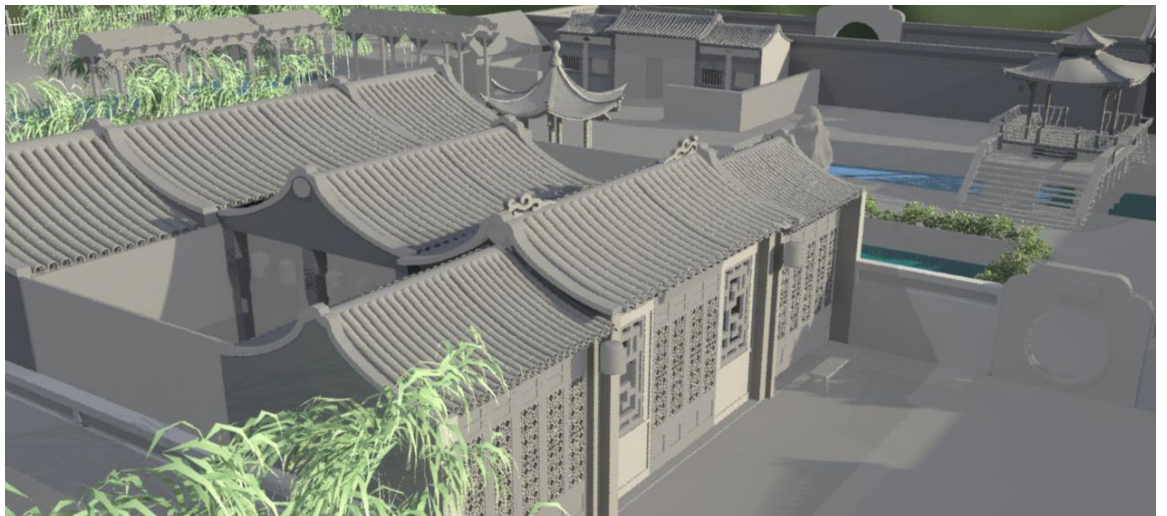
*(Fig 19) Scene 2, Main Pathway
3D Modeling/Pattern, Gray Box
Autodesk Maya*

Modeling The Taiwanese Houses

Traditional Taiwanese houses are the most complicated structures in my project as their proportions are different from today's architecture. Each house and landmark had to be well calculated to match the photos in the original documentation.



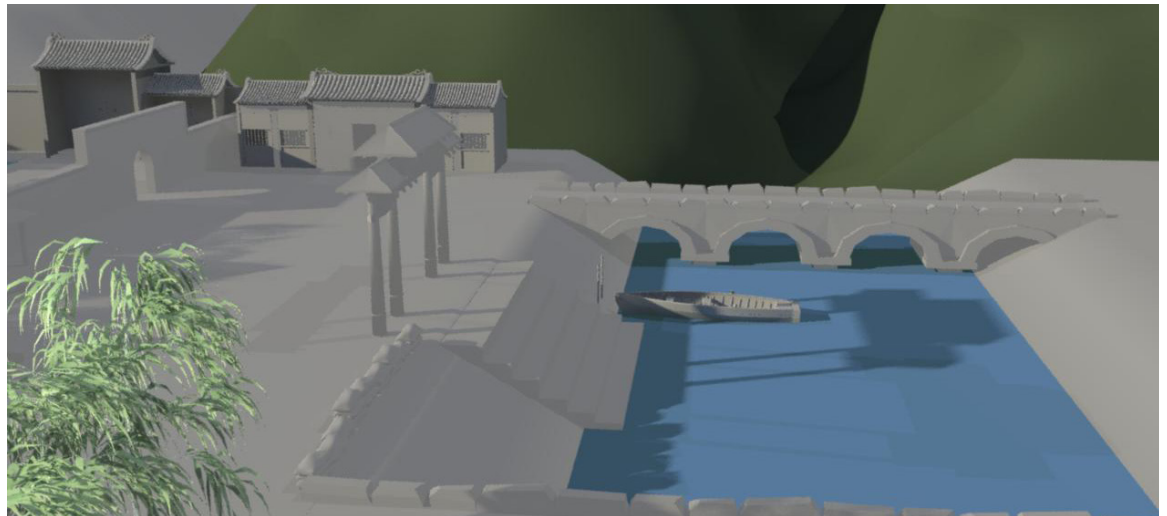
*(Fig. 20) Scene 1, Main Scene Market
3D Modeling, Gray Box
Autodesk Maya*



*(Fig. 21) Scene 2, Main Scene House/Window Design
3D Modeling, Gray Box
Autodesk Maya*

Modeling The Taiwanese Houses

Bridges and bodies of water were also considered important elements of traditional Taiwanese architectural design. People believed that having water around or building a house near bodies of water meant more wealth and protection for the family.

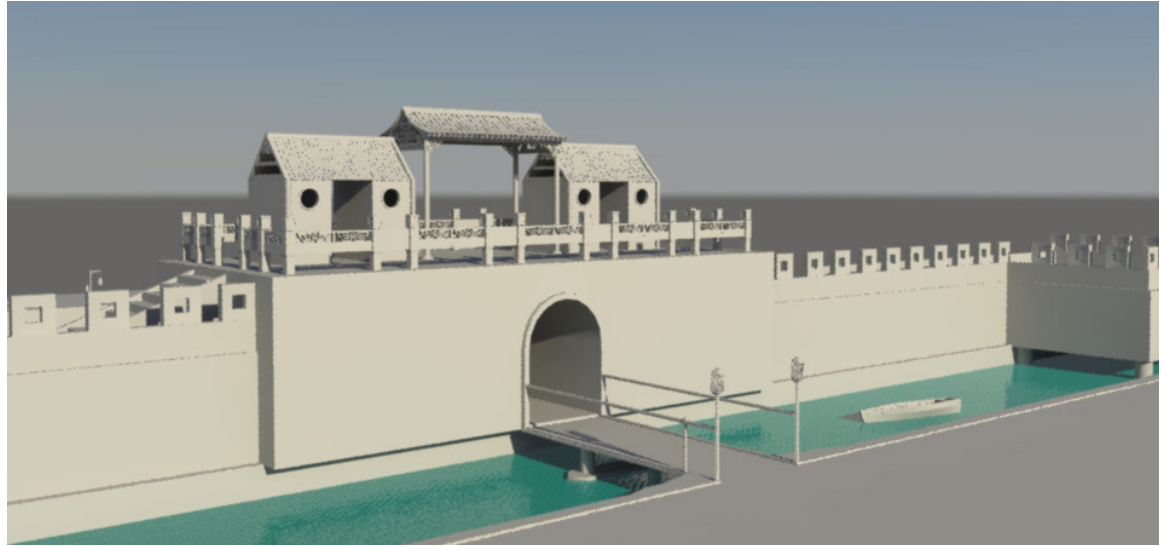


*(Fig 22) Scene 2, Bridge / Common Houses
3D Modeling, Gray Box
Autodesk Maya*



*(Fig 23) Scene 2, Garden Design
3D Modeling, Gray Box
Autodesk Maya*

Modeling The Taiwanese Houses



*(Fig. 24) Scene 1, Main Entrance Gate
3D Modeling, Gray Box
Autodesk Maya*



*(Fig. 25) Scene 2, Garden and Housing Design
3D Modeling, Gray Box
Autodesk Maya*

Modeling The Mixed Culture Architecture

Taiwan is liberalized and open. Nowadays, it has become a more attractive place for foreigners to visit and to live and invest in. As such, Taiwan is gradually emerging as a multicultural society. In some areas, Japanese influence remains strong in Taiwan; other than that, western culture has played an increasingly important role in as well. Architecture is one of the most obvious example of these influences and this is the reason why I not only want to showcase traditional Taiwanese architecture but also feature the changes that have occurred during Japanese colonial time. We have lost many valuable constructions during the Second World War and it is critical that we preserve and maintain what monuments we have left.

One of the most important turning points in Taiwanese architecture occurred under the Japanese rule. During the Japanese colonial period between 1895 to 1945, the Japanese government took over Taiwan instead of destroying the country, which explained why they actually brought in more constructions, and even preserved some of our buildings.

Japan considered Taiwan not only as a source of raw materials for Japan's industries but a colonial market for Japanese goods and a model for economic growth. Taiwan also provided Japan with an important strategic outpost and a southern defensive position. Compared to other colonized countries, Taiwan had a much more positive outlook of the colonial experience than others as Taiwan's colonization was driven by Japanese strategic interests, which included economic prosperity.

Economic development included expanding the train stations and local museums, taking over residential houses, and turning them into Japanese prince hotels. There were also marked improvement in our vehicles, hospitals, and schools. In the same manner, the impact of Japanese architecture, which carried a strong influence from western architectural style, could be seen in the buildings that they constructed in Taiwan during the colonial time period. Needless to say, this created a multi-cultural architecture in Taiwan.

To create the scenes for Japanese-Taiwanese-style houses, all the models have to be recreated from photographic and historical documentation. As such, I repeated the research and sketch process to define the style before starting with the ground plan and gray box in Autodesk Maya

Modeling The Mixed Culture Architecture

In 1885, Taiwan became a province. A decade later, Japan defeated the Qing dynasty and made Taiwan a colony. The 1910s was a period of urbanization, resulting to a great change in Taiwanese traditional architecture. Meanwhile, modern architecture took over in 1945 and only a few buildings – apart from temples – have since been built in the traditional style.

Despite air raids during the Second World War and the breakneck growth of Taiwan's cities since the 1950s, a considerable number of Japanese-era buildings have survived throughout Taiwan. Many of these structures were built to last and impress the colonized people.

Although many of Taiwan's best-known Japanese-era landmarks are in Taipei, several exist in the south. Tainan is synonymous with fabulous temples and quaint alleyways, and tourists are often equally impressed by the city's Japanese colonial-era architectural assets.

Taiwan was Japan's first colony, and the Japanese were determined to show the world that they were a serious and capable new colonial power. Japan invested heavily in the island's infrastructure, most notably the electrification of the island. In the 1930s, Japan began its more aggressive expansionist policies into the Pacific and wanted to build a stronger Japanese identity among the Taiwanese.

Schools were built and roads opened up new trade routes. At the time, most Taiwanese quickly settled into their new life as Japanese subjects. The taller and mixed western-style buildings were built, and the railways through the whole island were also expanded.



*(Fig. 26) Scene 4. Public Area
Office of the President
Taipei, Taiwan*

Modeling The Mixed Culture Architecture



*(Fig. 27) Scene 3. Public Area
Japanese Style Building Reference
Beitou, Taiwan*



*(Fig. 28) Scene 3. Public Area
Japanese Tower Design Reference
Tainan, Taiwan*



*(Fig. 29) Scene 5. Public Area
Japanese Style Building Reference
Taipei, Taiwan*



*(Fig. 30) Scene 5. Public Area
Japanese Style Building Reference
Dansui, Taiwan*

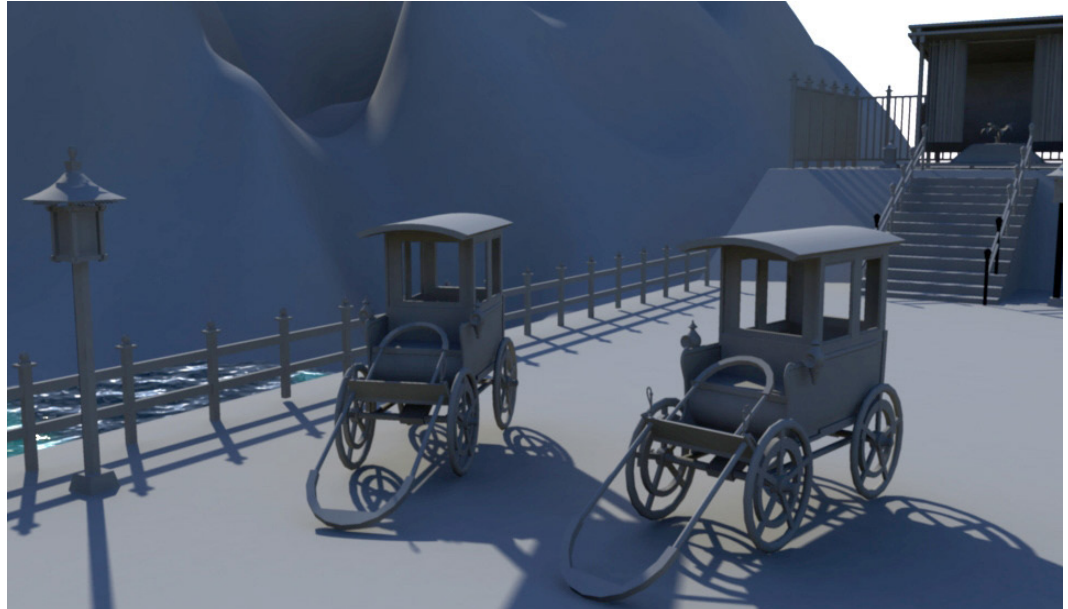


*(Fig. 31) Scene 4. Railway Station Area
Japanese Style Train Station Reference
Kaohsiung, Taiwan*



*(Fig. 32) Scene 4. Railway Station Area
Japanese Style Train Station Reference
Hsinchu, Taiwan*

Modeling The Mixed Culture Architecture

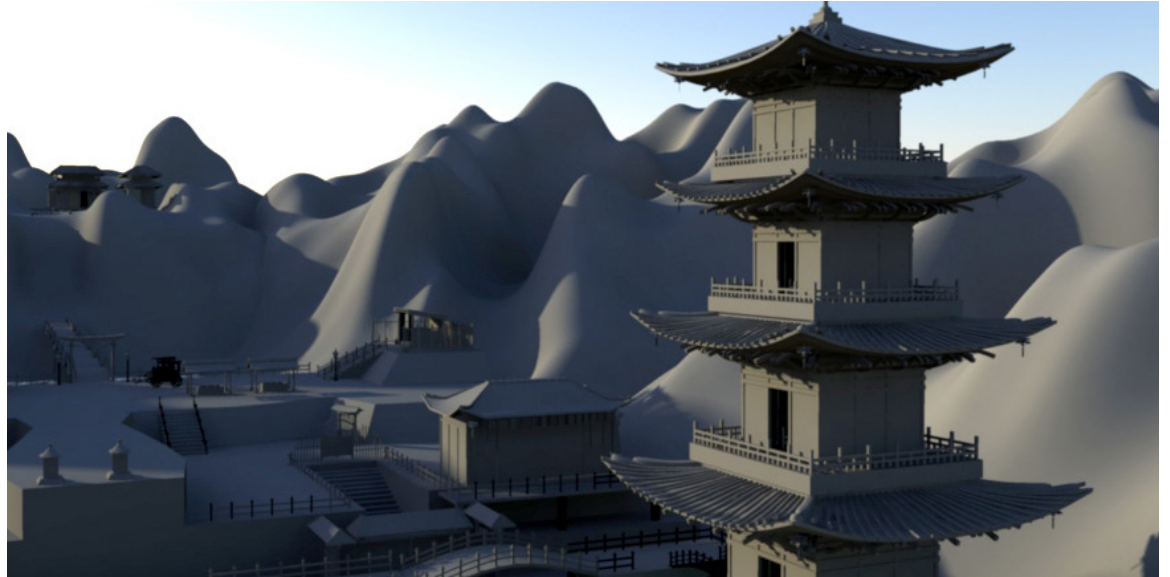


*(Fig. 33) Scene 3, Old Time Japanese Style Vehicles
3D Modeling, Gray Box
Autodesk Maya*

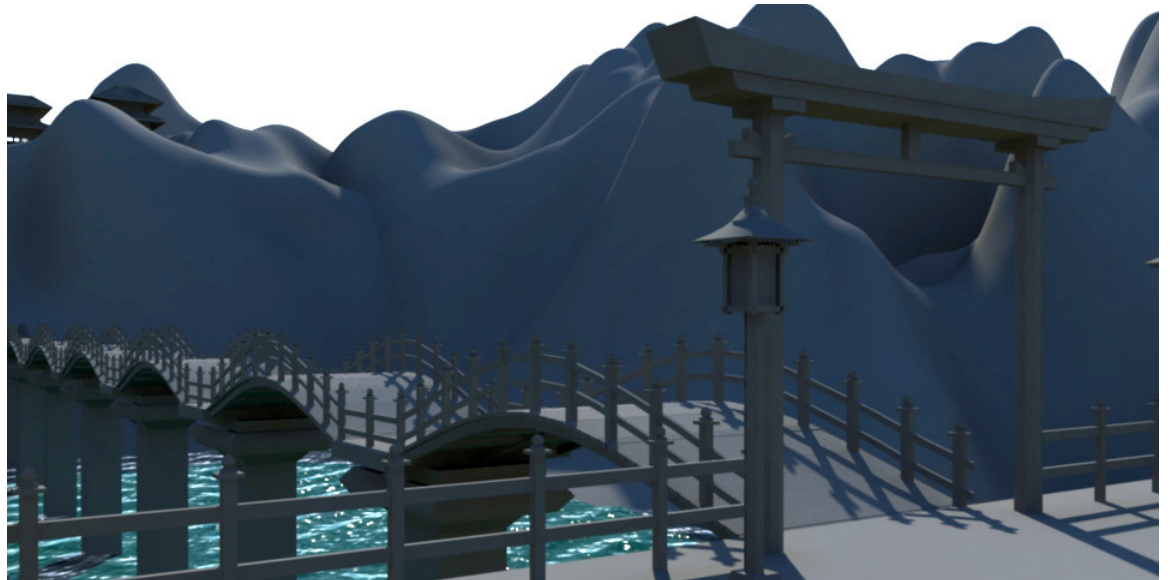


*(Fig. 34) Scene 4, Train and Train Station
3D Modeling, Gray Box
Autodesk Maya*

Modeling The Mixed Culture Architecture



*(Fig 35) Scene 3, Japanese Style Houses
3D Modeling, Gray Box
Autodesk Maya*

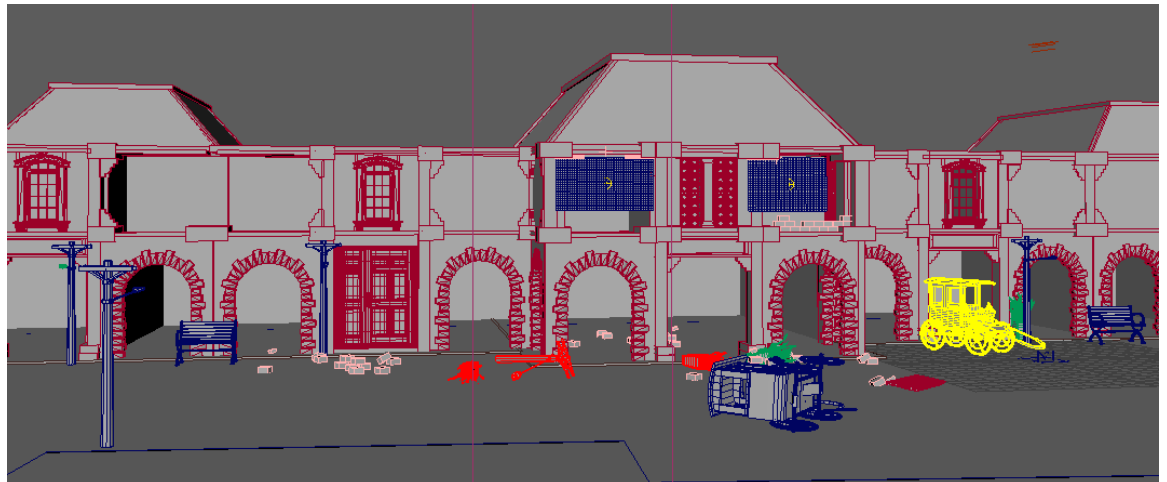


*(Fig 36) Scene 3, Japanese Style Gate
3D Modeling, Gray Box
Autodesk Maya*

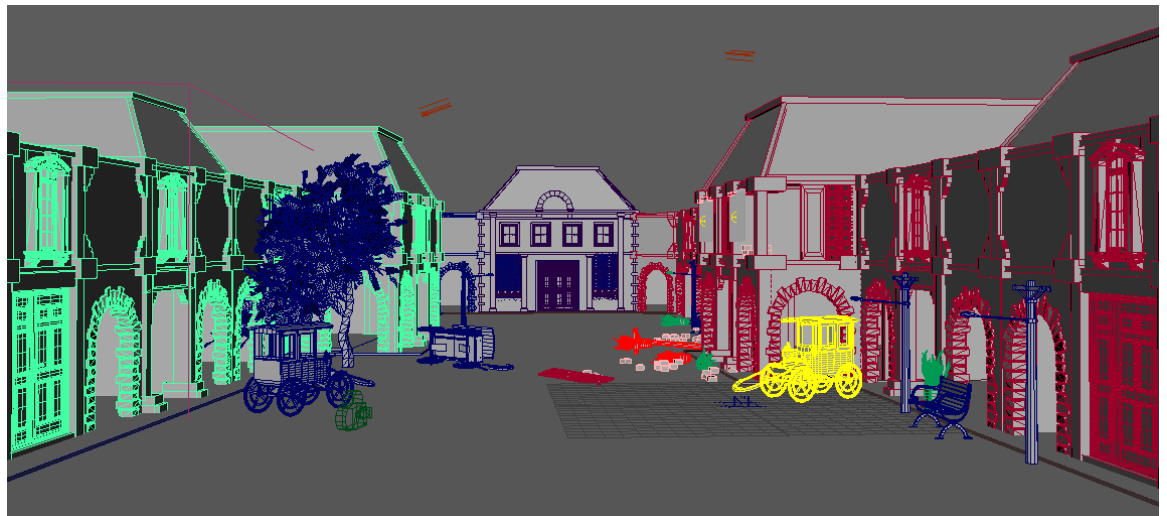
Modeling The Mixed Culture Architecture

As a result of the war, Taiwan suffered many losses, including severe economic repercussions from allied bombing raids and the destruction of countless buildings. For this reason, I wanted to make the recreation of monuments we have lost a part of my thesis project as well.

This scene, because of all the heavy effects in it, needed to be broken down into several different layers. In order to easily verify what models are in which layer, I marked them with different colors (see fig. 37 and figure 38).



(Fig 37) Scene 5 Wire frame with separated layers



(Fig 38) Scene 5 Wire frame, Layered with separated layers

Particles and Dynamics Process

Particles and dynamics proved most challenging in my thesis. My goal was to create realistic scenes, incorporating natural phenomena such as wind, smoke, shatter effects, ocean waves, and falling leaves.

For this part, I focused on the use of nCloth and 3D particle system. Creating smoke and fire was one of the most difficult parts for me; hence, I had to research on how each type of fire looks in specific situations and what type of smoke it might create. The color varies based on the causes. In the same way, the environment in my project is based on the house and forest fire; therefore, the color is closer to orange and yellow, whereas the color of the smoke ranges from gray to black.



(Fig 39) House Fire Reference



(Fig 40) House Fire Reference



(Fig 41) Wide Range Fire Reference



(Fig 42) Wide Range Fire Reference



(Fig 43) Wide Range Fire Reference



(Fig 44) Wide Range Fire Reference

Particles and Dynamics Process

For this scene (see fig 45 and fig 46), I used the 3D container and emitter – particles and dynamics system – for all fluid effects, such as fire and smoke. The many different dynamic effects in Maya allows the creation of just about any simulation imaginable, whether it is an ocean, a nuclear explosion, or water being poured into a glass. Although one of the most time- consuming parts of the project, 3D fluid containers are still a great way to create some exceptional fluid effects that affords much control over where my fluid effects travel to and how they look.



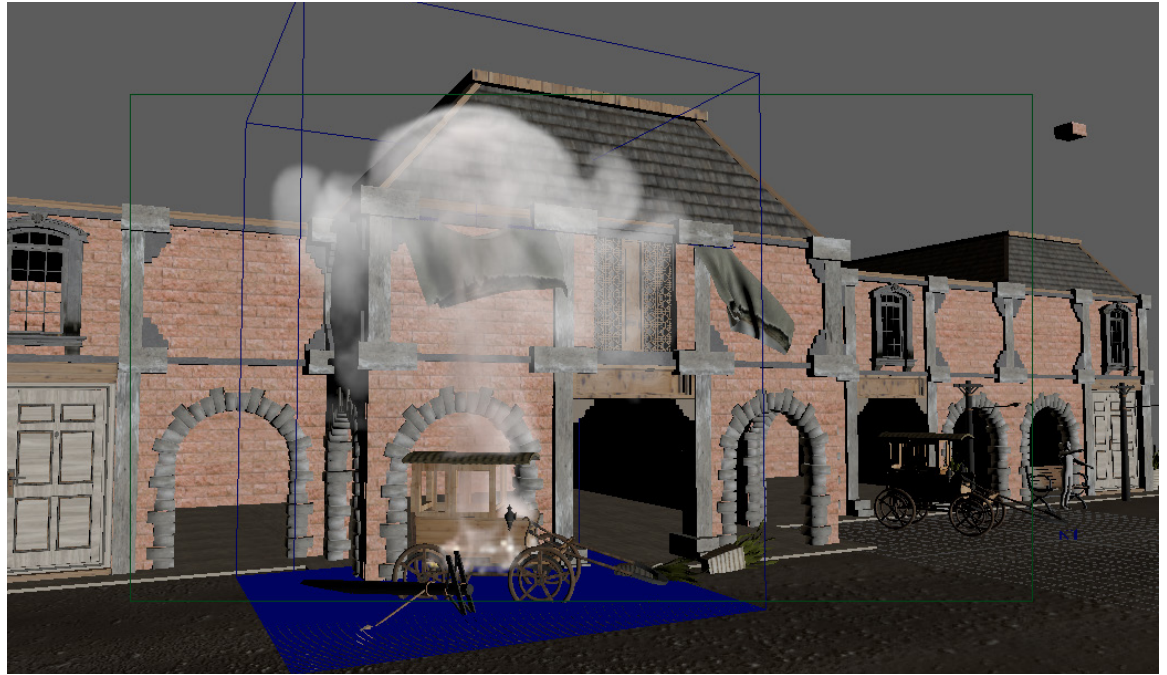
*(Fig. 45) Main models for scene 5
With textures for further special effects*



*(Fig. 46) Main models for scene 5
With textures for further special effects*

Particles and Dynamics Process

Because this scene contains several 3D fluids and nCloth effects, it was impossible for me to test and render all the effects in one shot; therefore, I divided all the effects into separate layers and tested them one by one. After the main background, I started adding more explosion effects. Subsequently, I adjusted the assets and colors based on the reference images I found to make all the fluid effects as close to the actual phenomenon as possible.



(Fig 47) Smoke Effect Testing



(Fig 48) Smoke Effect Testing



(Fig 49) Smoke Effect Testing

Particles and Dynamics Process

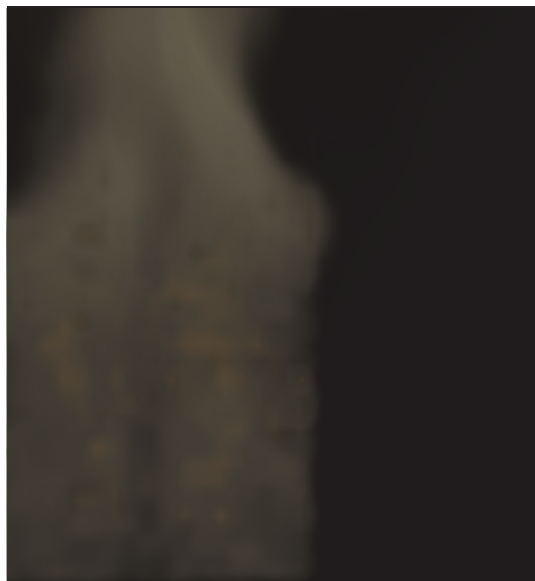
When I was working on fluid effects, I realized that given the high density of particles running in one scene, the hardware limitation, and the number of machines I have, it was impossible for me to render all the effects in one shot. I had to either lower down the resolution or break them into several layers and render them separately. My plan was to create a realistic environment for the project, so I needed to retain high resolution, and I thereby chose compositing as a solution.



(Fig. 50) The breakdown layers of the scene with fluid effects



(Fig. 51) The breakdown layers of the scene with fluid effects

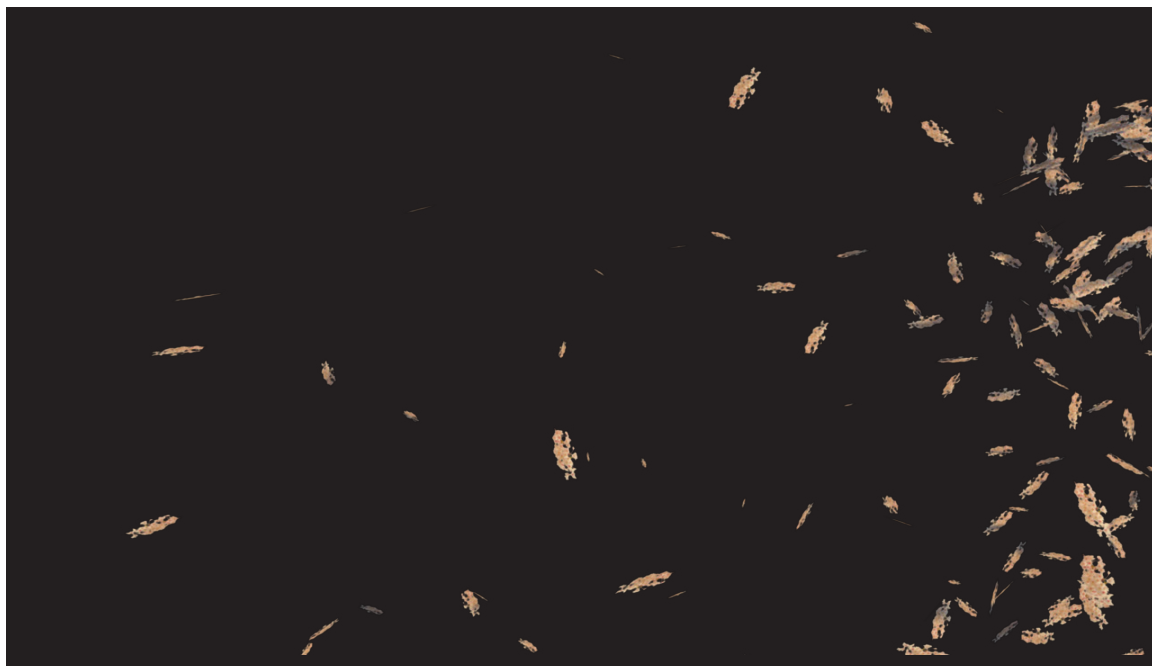


(Fig. 52) The breakdown layers of the scene with fluid effects



(Fig. 53) The breakdown layers of the scene with fluid effects

Particles and Dynamics Process



(Fig. 54) Another separated layer of nCloth effect for falling leaves



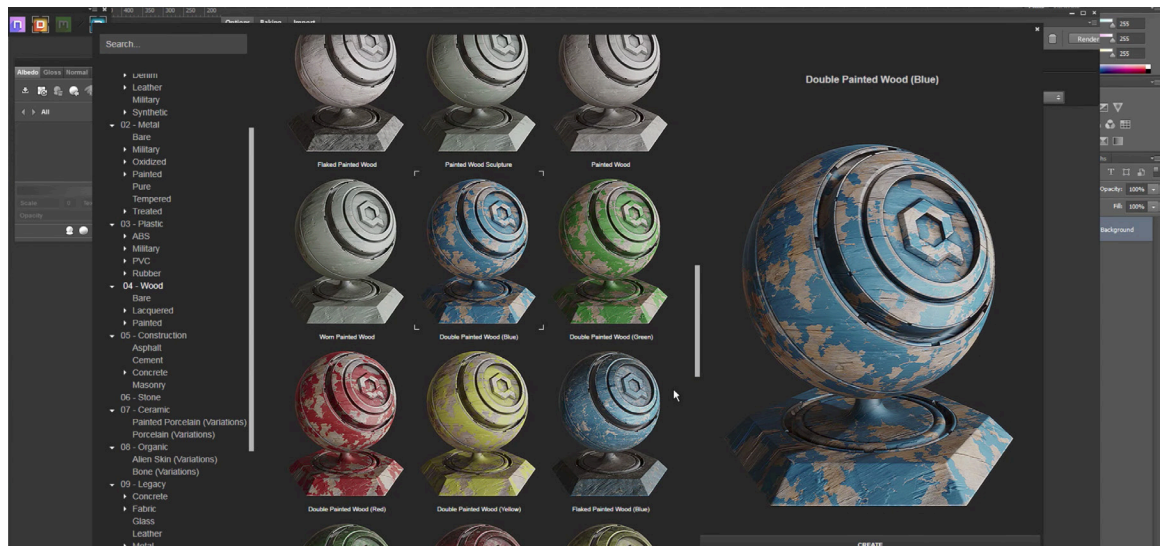
(Fig. 55) The main background model with massive smoke effect

Texture Design Process

There are many ways to apply materials to 3D models other than Autodesk Maya and Mudbox. While researching on techniques, I found a new application called Quixel. This scan-based PBR (Physically Based Rendering) texturing application in Adobe Photoshop can collaborate with 3D programs to create detailed and realistic textures, and it is also easy to modify.



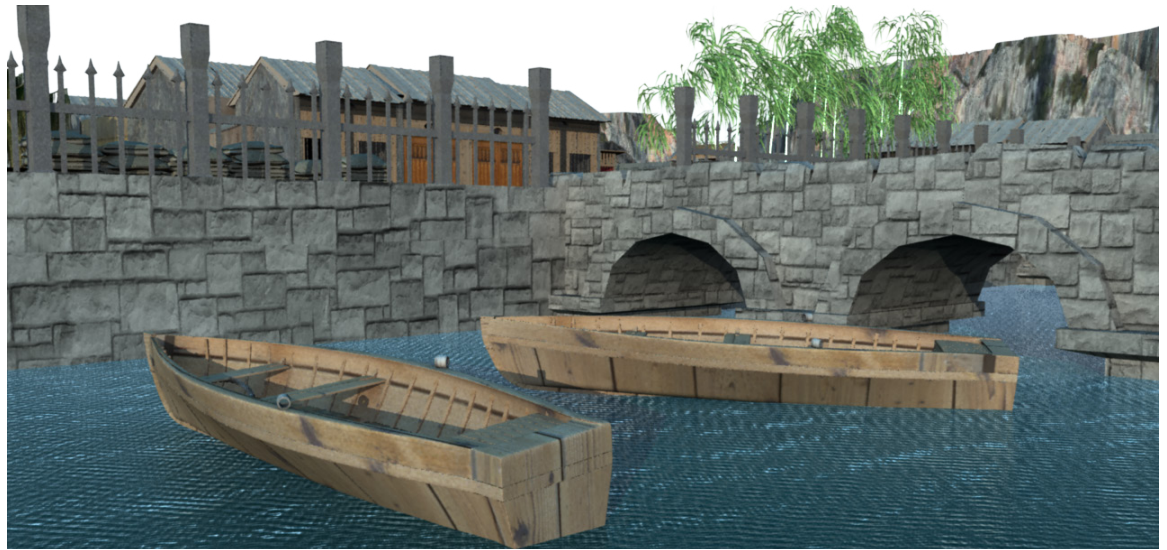
(Fig 56) Texture options in Quixel



(Fig 57) Texture options in Quixel

Texture Design Process

In order to decrease the poly count and yet retain photo realistic quality, I had to exert much effort in creating detail on the textures. My thesis project aims to showcase the old Japanese-Taiwanese-style architecture; therefore, creating imperfections in the texture was necessary as they cannot appear too modern. Some secondary details also needed to be taken into consideration, such as the stains on the house walls, the cracks in the bricks, the scale of the ocean waves from short and long distances, the tearing on the canvas, and the moss on the rocks, soaking in the water.

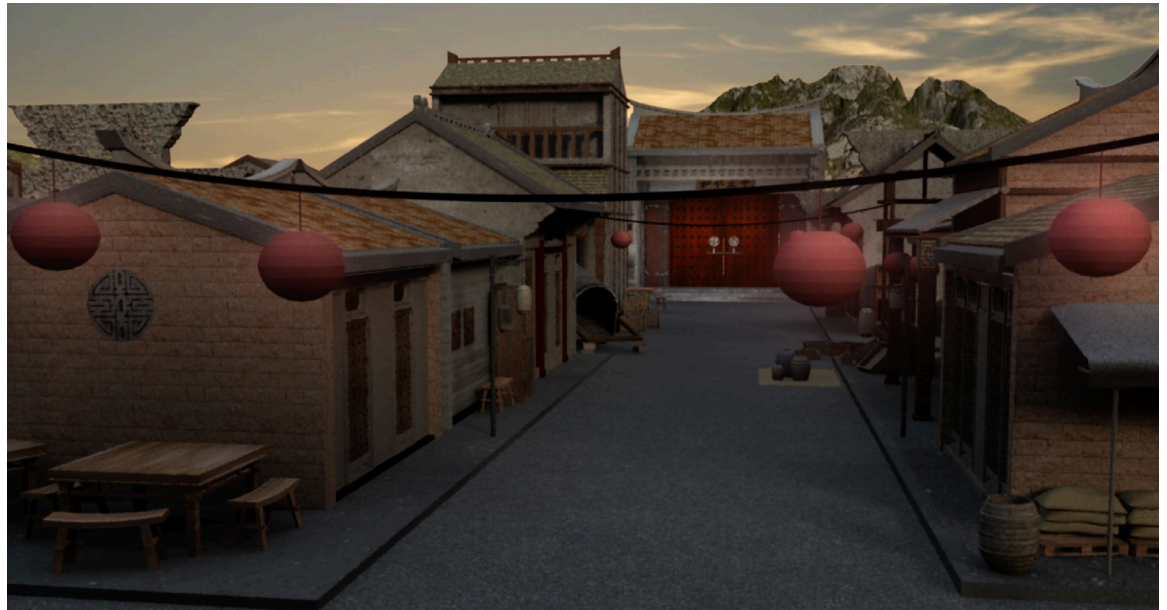


(Fig. 58) First Version of Ocean Shader and Bridge Texture



(Fig. 59) Second Version of Ocean Shader and Bridge Texture

Texture Design Process



(Fig. 60) Scene 1 Models with Texture



(Fig. 61) Scene 2 Models with Texture

Texture Design Process



(Fig. 62) Scene 1 Models with Texture



(Fig. 63) Scene 2 Models with Texture

Lighting and Color Management

Lighting is usually the project's final touch. Lighting determines how the overall atmosphere would turn out. I was indecisive whether I wanted my whole project to be presented using the same time of the day, or to have some parts at day time and some at night time to create variation.

Initially, I created all the scenes at day time using physical sun and sky, without any additional light. I showed the project to my professors, and lighting became the big issue. My thesis project is a 2-minute video with a day time atmosphere only, and this made the video look plain and boring. After a discussion with my professors, I decided to create not only a day time atmosphere but also include sunset and early morning. I also followed the suggestion of replacing physical sun and sky with image-based lighting. However, as this was my first time to use image-based lighting, the result did not go as planned until I added extra lighting to support it.



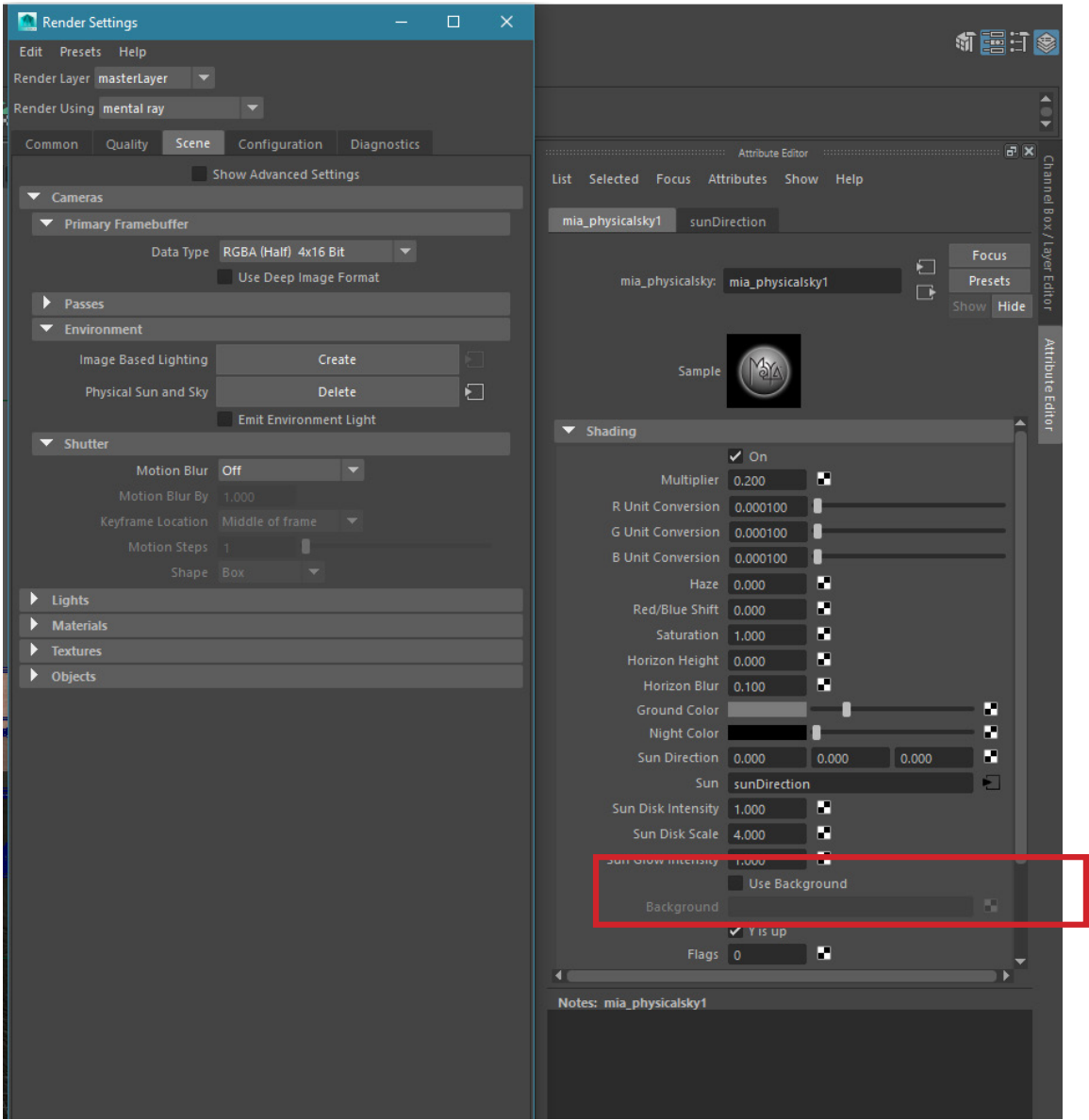
(Fig. 64) Creating Lighting Using Physical Sun and Sky



(Fig. 65) Creating Lighting Using Image Based Lighting and High Resolution Image

Problems and Solutions

One of the biggest issues I had in this project was the lighting. One issue came about when I rendered some of the models without any background under physical sun and sky as different color reflections appeared above and below the horizontal lines. First, I thought that I was not separating the layers correctly. Eventually, I realized that I had to create another empty background for it to overwrite the default physical sun and sky background (see fig 66).



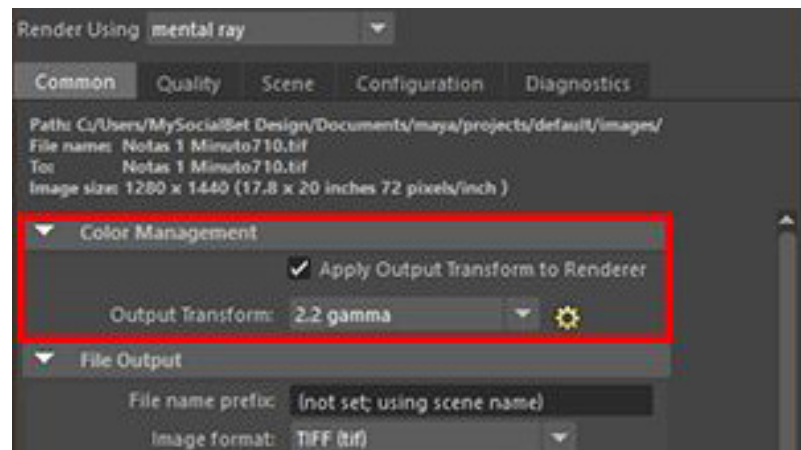
(Fig 66) Screen shot in Maya

Problems and Solutions

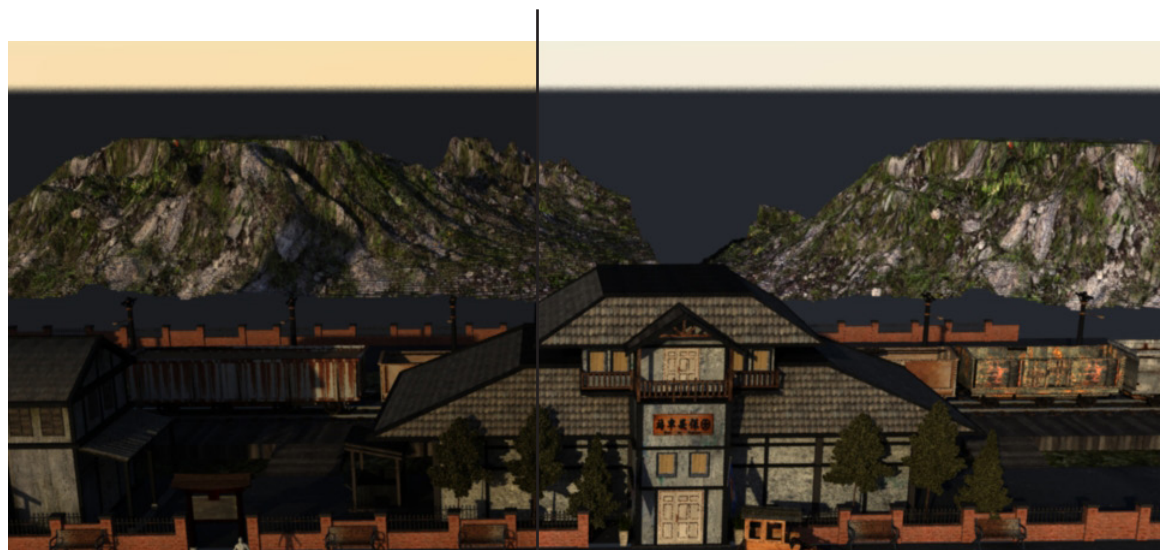
Another issue I had with lighting was the preview and batch render scene, which seemed to have different light sources. At times, the images showed a few shades darker in some areas. After some research, I found out that the default settings may vary according to the version of Maya.

The Autodesk Maya website explains that when we render a scene, we have the option of baking an output color to transform into the result. The output transform is intended to convert color values from the rendering space to a color space that is more suitable for display.

We can activate apply output transform and specify the particular output transform to apply in the color management preferences. We can also set output transform to use view transform to use the same view transform as is configured in the preferences.



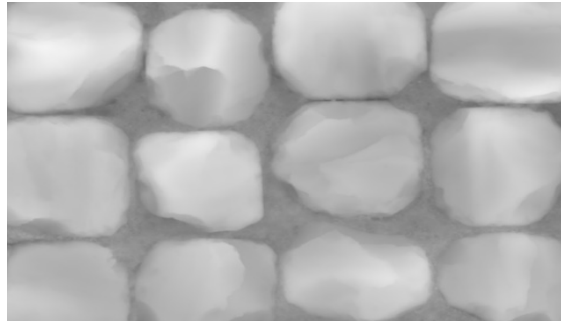
(Fig. 67) Screen shot in Maya



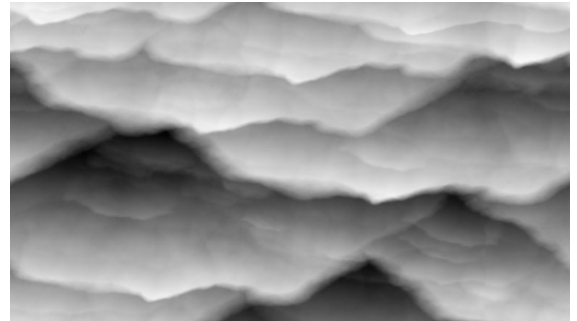
(Fig. 68) Before (Left) and After (Right) Applying Output Transform to Renderer

Problems and Solutions

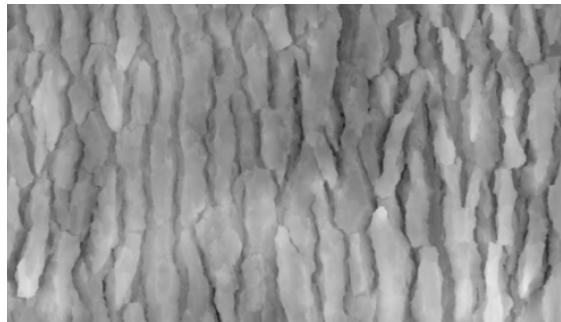
I tried to determine how to make high-detailed scenes using minimal poly counts. I initially insisted on making every element in polygon but the poly counts of some houses went beyond 500,000 polygons. Although I intended to create photo-realistic 3D environments, I still wanted to find a way to decrease the poly counts without affecting the details. As such, I replaced some parts with displacement maps and re-modified the textures to reach similar results. The results were as I have expected, and after replacing some high-poly faces with displacement maps, the render time with modeling itself showed a big difference.



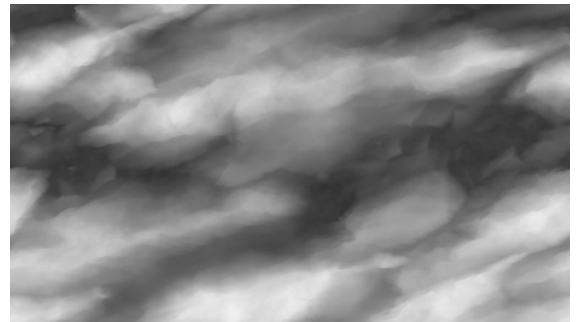
(Fig. 69) Rock Floor Displacement Map Reference



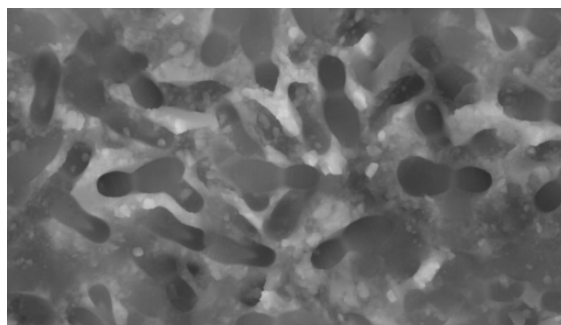
(Fig. 70) Rock Wall Displacement Map Reference



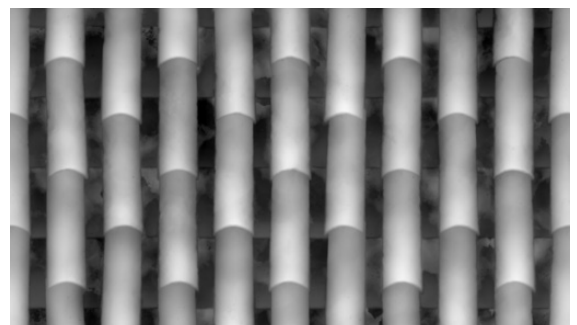
(Fig. 71) Wet Sand Displacement Map Reference



(Fig. 72) Concrete Wall Displacement Map Reference



(Fig. 73) Ground Displacement Map Reference



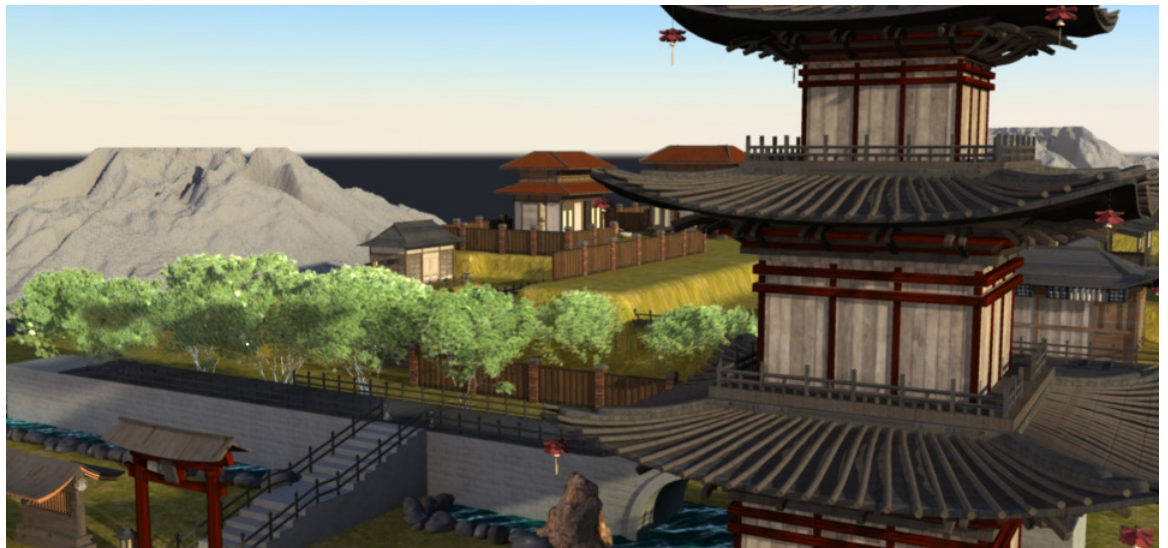
(Fig. 74) Tile Roof Displacement Map Reference

Problems and Solutions

The before and after comparison of using displacement maps for the mountain was rather extreme. The mountain in the original version (see Figure 75) was not only low poly but also seemed amiss in the scene. After replacing all the standard maps with displacement maps (see Figure 76), it showed more detail and became more realistic.



(Fig. 75) Creating Mountains using sculpting tools



(Fig. 76) Creating Mountains using displacement Map

Summary

Audience Feedback and Revision

After I rendered and composited all the layers and scenes with background and color correction, I made sure that the speed was even and carefully reviewed the video to see if I maintained a successful level of stylistic consistency within each scene and design. I then presented the completed project in a 3-and-a-half-minute video to all my advisors and friends. My advisors approved the overall design quality and consistency of the style, and they also provided me some really helpful feedback. Others also offered some positive feedback and suggestions.

Since I did not render the background in Maya with all other models, I composited all of them in Adobe After Effects instead. In relation to this, my advisors pointed out that some background did not have the same movement as my front scene; the consistency was unsatisfactory and it was necessary to revise them.

I also received valuable feedback from people who had the opportunity to preview my project. Some stated that the background music was a rather too plain. Hence, to resolve this issue, I collected suitable sound effects, blended them into my project without obvious effects on the main background theme music.

Conclusion

I created this project to generate information and create awareness about my country – Taiwan – and its art and architecture that I admire. Completing this project entailed all the skills I acquired during my education and training at Rochester Institute of Technology (RIT), as well as those I have learned and developed during the research process. This project titled Reborn of the Beauty evoked in me even greater interest in 3D and visual effects.

Unlike the older generation, younger people in Taiwan nowadays are not familiar with the country's history. In addition, most of the historical documents or videos related to Taiwanese history, art, and architecture are unheard of or unavailable overseas. Moreover, information related to Taiwan are sometimes only available in Mandarin, which makes it impossible for non-Mandarin speakers to fully understand them. These have prodded my desire to complete this project and actually achieve it.

Appendix

REBORN OF THE BEAUTY

Ting Hsuan Tsao

Thesis Proposal for the Master of Fine Arts Degree

Rochester Institute of Technology
College of Imaging Arts and Sciences
School of Design
MFA Visual Communication Design
October 30th, 2014

Thesis Committee Approval

Chief Thesis Adviser
Daniel DeLuna, Associate Professor
Visual Communication Design

Signature of Chief Thesis Adviser

Date

Associate Thesis Adviser
Shaun Foster, Assistant Professor
Visual Communication Design

Signature of Associate Thesis Adviser

Date

Associate Thesis Adviser
Chris Jackson, Professor
Visual Communication Design

Signature of Associate Thesis Adviser

Date

MFA Thesis Candidate
Ting Hsuan Tsao

Signature of MFA Thesis Candidate

Date

Abstract

In order for the past to be known, brought to bear in cultural production and be shown on screen, 3D techniques play an important role in this field. Modeling and 3D visual effects using technical tools or other computer methods to achieve high returns from the movie industry has become prominent in today's technology tendency.

Taiwan- always be identified as the province of China-actually has it's own unique culture and history background. Ever since more and more Taiwanese people going overseas, we get to introduce our countries to others. In finding the identity of place and telling a country's unique story which is no longer exist, 3D technique is the most useful way to bring the past back to live.

It's a good opportunity to show people the real Taiwan and the beauty of it's own unique architecture. The thesis project is going to be a 120 seconds film made by 3D software-Maya and compositing by Adobe After Effects.

Problem Statement

In ancient times, historical records were often kept using black and white photographs. If we don't have reliable witness who overseas the complete documentation, our history can easily be forgotten, and our culture will not be preserved for the next generation.

The film which has been made for showing that circumstance back to Taipei - the worst destruction happened- only show portion of the buildings which left after World War II. The published films for the event were being told by actors but not shown, audiences are hard to feel the real atmosphere, not to mention take a closer look at the beauty of our architecture. Taiwan has been considered as part of China, but the truth is that our culture might partially been affected by China and Japan, we still have our own language, culture and life style.

Even though we have been taking history class for the general idea of the development of our country but we seldom get the idea of why should the culture being protected, preserved and studied.

Even Taiwanese people are usually confused about the difference between Chinese style and Taiwanese style architecture, or since when Japanese style started into our culture.

In order to provide a better result of the project, my application will be the design of 3D project focusing on the architecture in Taiwan. The reason why I'm using 3D techniques is because the buildings which remain the style back to Sino- Japanese war are almost destroyed after World War II. What's left are mostly images and buildings for tourists only, but the scene can be rebuild by 3D techniques; I will also apply three visual effects to the project to show the moment of destruction during the war. On the other hand, architecture represent the impression of a country the most and able to show the changes of it's history.

Survey of Literature

Film

City of Silence (1989)

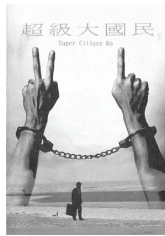
<https://www.youtube.com/watch?v=uJVvldKpeMM>

City of Silence is a 1989 Taiwanese historical drama film directed by Ho Hsiao-hsien. It tells the story of a family embroiled in the tragic "White Terror" that was wrought on the Taiwanese people by the Kuomintang government (KMT) after their arrival from mainland China in the late 1940s when Taiwan no longer be the colony of Japan, during which thousands of Taiwanese were rounded up, shot, and/or sent to prison. The film also shows alot of Japanese style buildings and culture.

The Citizen of KO (1996)

Http://www.youtube.com/watch?v=ZZNljiW_2rc

This Taiwanese historical drama will be most meaningful to those familiar with the island's 20th-century politics, especially from the 1950s onward during an uprising called the "White Terror" which led to the establishment of martial law through 1987. During this time, anyone suspected of any communist leanings at all was immediately imprisoned.



Local Video Documentation

History of Taiwan-My Home, My Roots (1-7)

<https://www.youtube.com/watch?v=jjd4KyBfaBI&list=PL559D5DB1F22BBE90>

<https://www.youtube.com/watch?v=avrKdYbRboU>

History of 228 incident (1-2)

<https://www.youtube.com/watch?v=7wD4YQ1Lmtg>

Forgotten Battlefield

<https://www.youtube.com/watch?v=MxzX-zJXRTs>

228 current look-228 Peace Memorial Park, Taipei, Taiwan

https://www.youtube.com/watch?v=7sVP_eknPZI&list=PLKSDrDH7un0K0RV1anThnf-D2PRE6XNIF

Overview of 228 incident

<https://www.youtube.com/watch?v=H7Qsklc4nyE>

Survey of Literature

Documentation

Remembering New Taiwan, Ilha Formosa

<http://www.taiwandc.org/228-intr.htm>

The incident and the Taiwan Independence

<http://cin.sagepub.com/content/21/3/373.abstract>

BBC World Service - Witness, Taiwan '228 Incident'

<http://www.bbc.co.uk/programmes/p01tcm88>

Understand context of 228 Incident

<http://www.taipeitimes.com/News/editorials/archives/2014/03/14/2003585587>

Inside Taiwan's Political Purgatory

<http://www.examiner.com/article/inside-taiwan-s-political-purgatory-228-massacre-scars-taiwan-history-part-3-of-20>

Reference

CGI VFX Breakdown Showreel HD: "Stalingrad VFX Show-reel 2013"

<https://www.youtube.com/watch?v=rwzwxGB2NbU>

Seediq Bale

<https://www.youtube.com/watch?v=PGAuyah5cKw>

World War Z, Jerusalem Sequence

https://www.youtube.com/watch?v=NTr0k6-8_Fw

"World of Warships" by Vladimir Abramov

<https://www.youtube.com/watch?v=Km92Da1Rhdk>

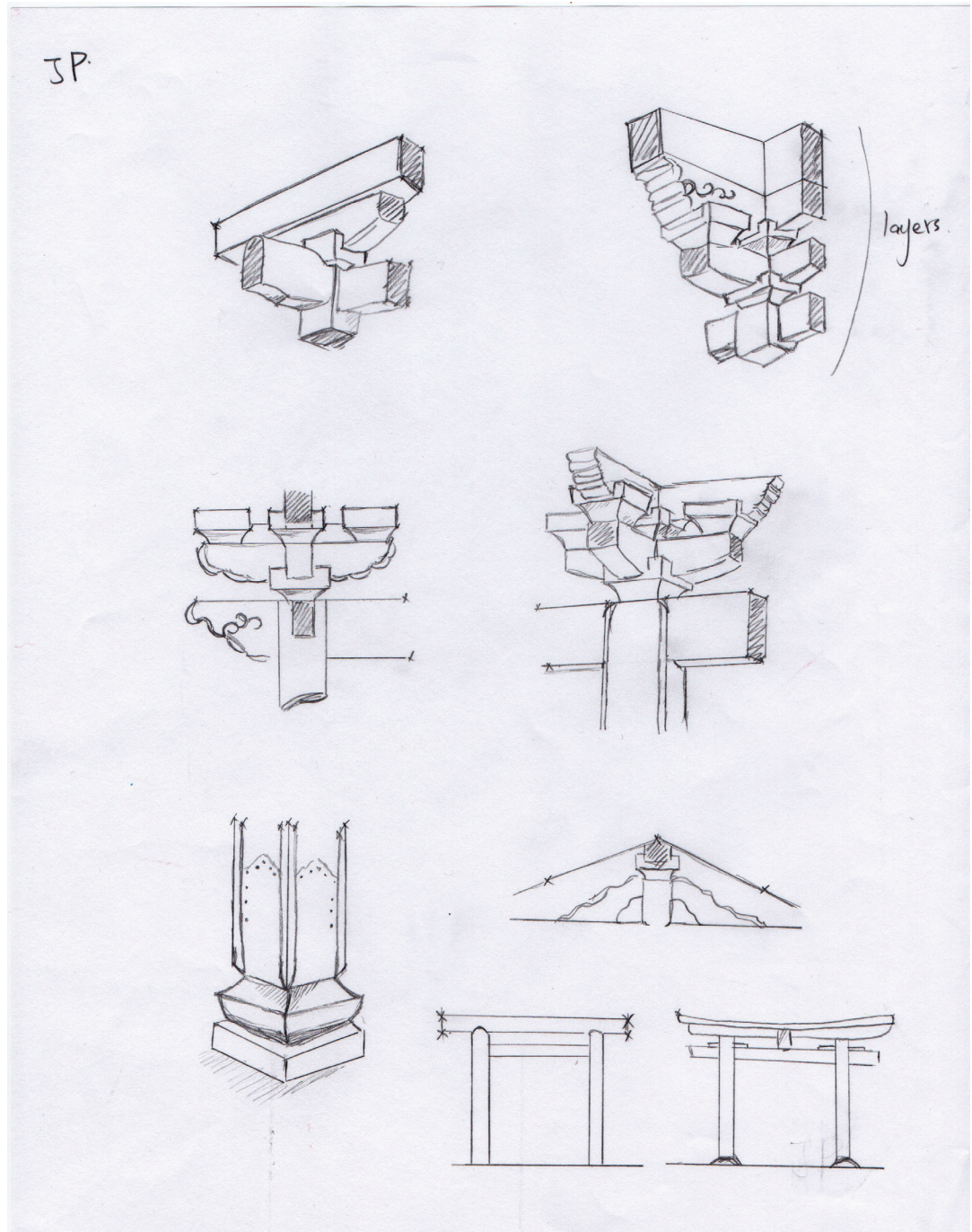
StarCraft 2: Heart of the Swarm

<https://www.youtube.com/watch?v=mPgW6D-MzOo>



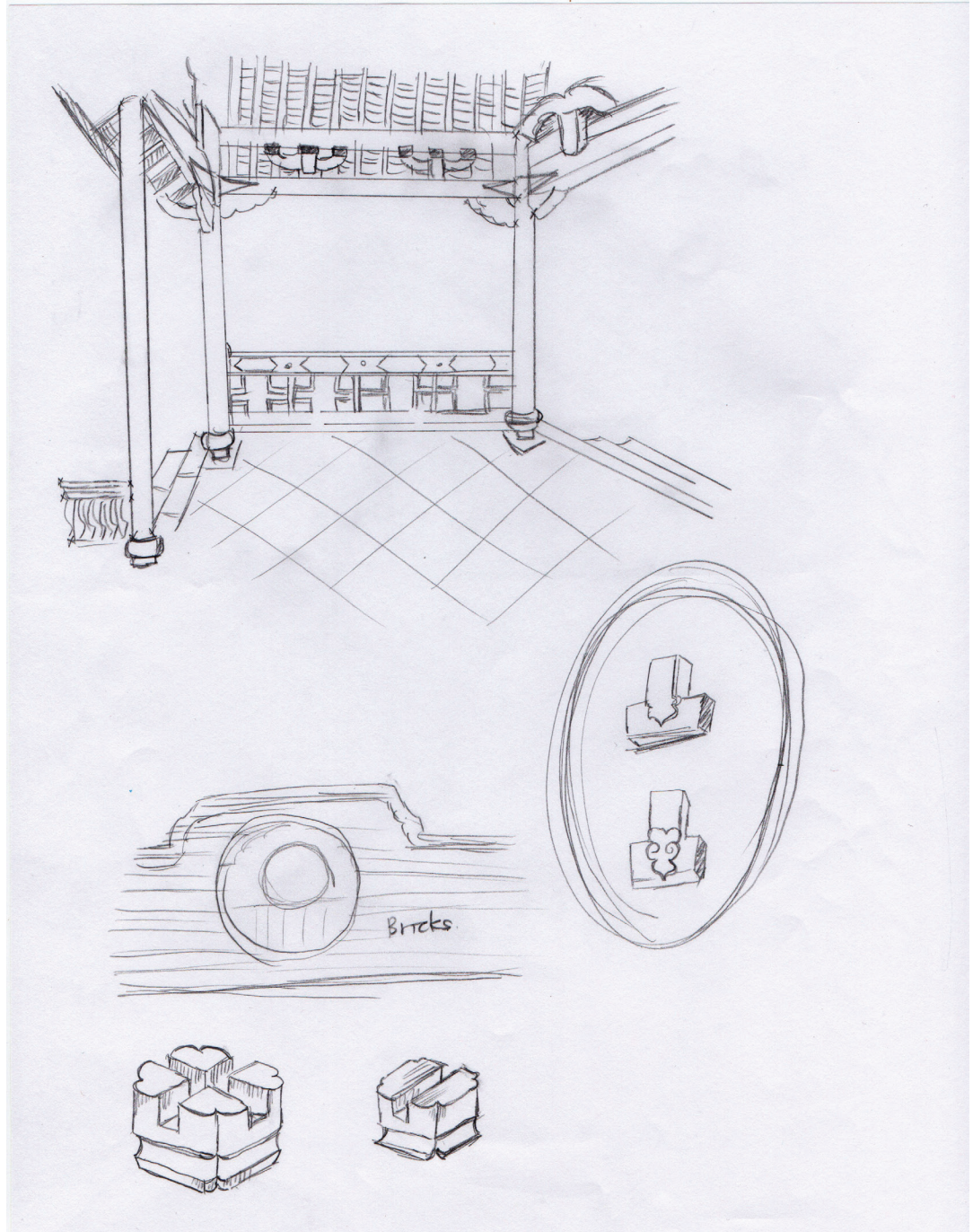
Design Ideation

Sketch



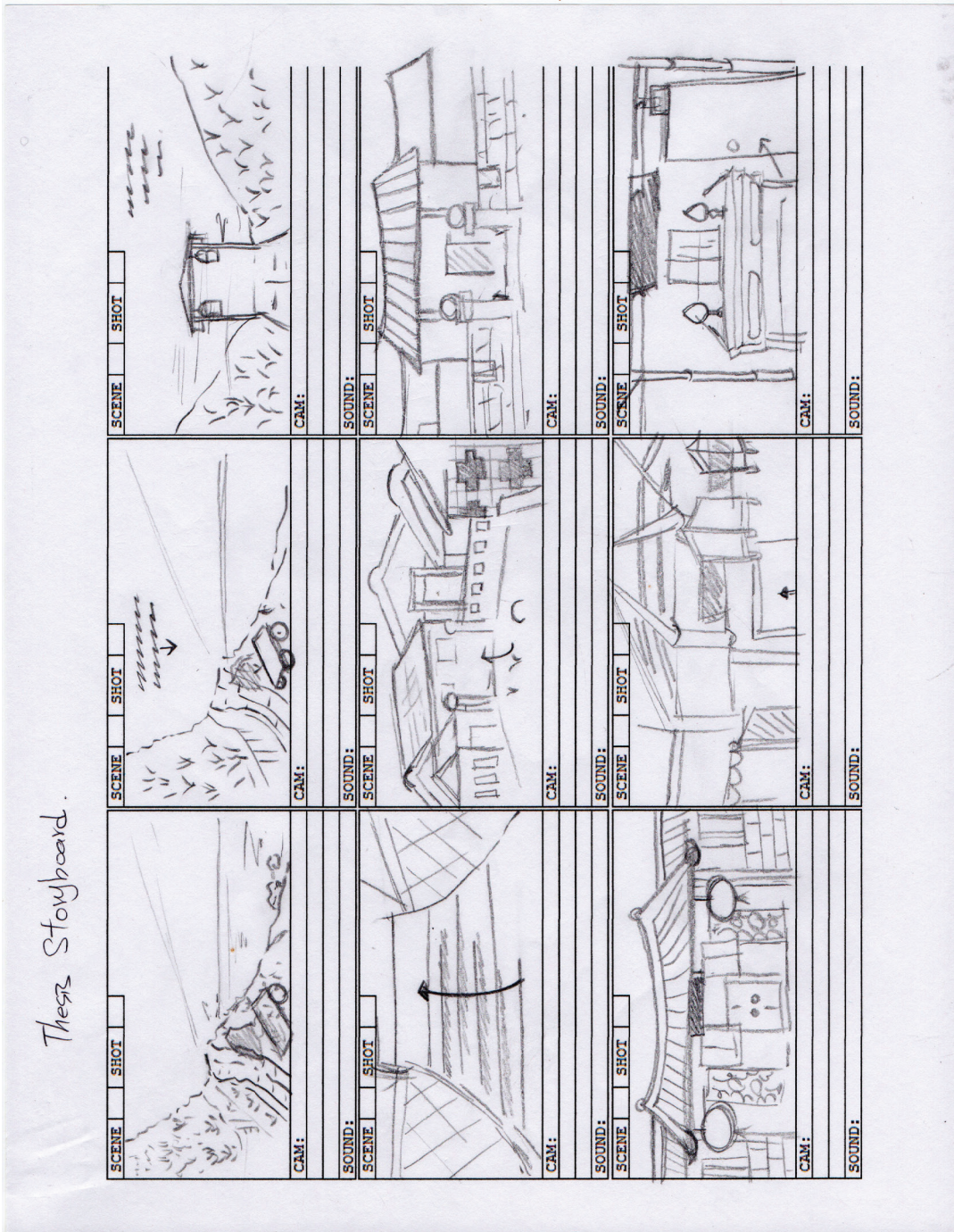
Design Ideation

Sketch



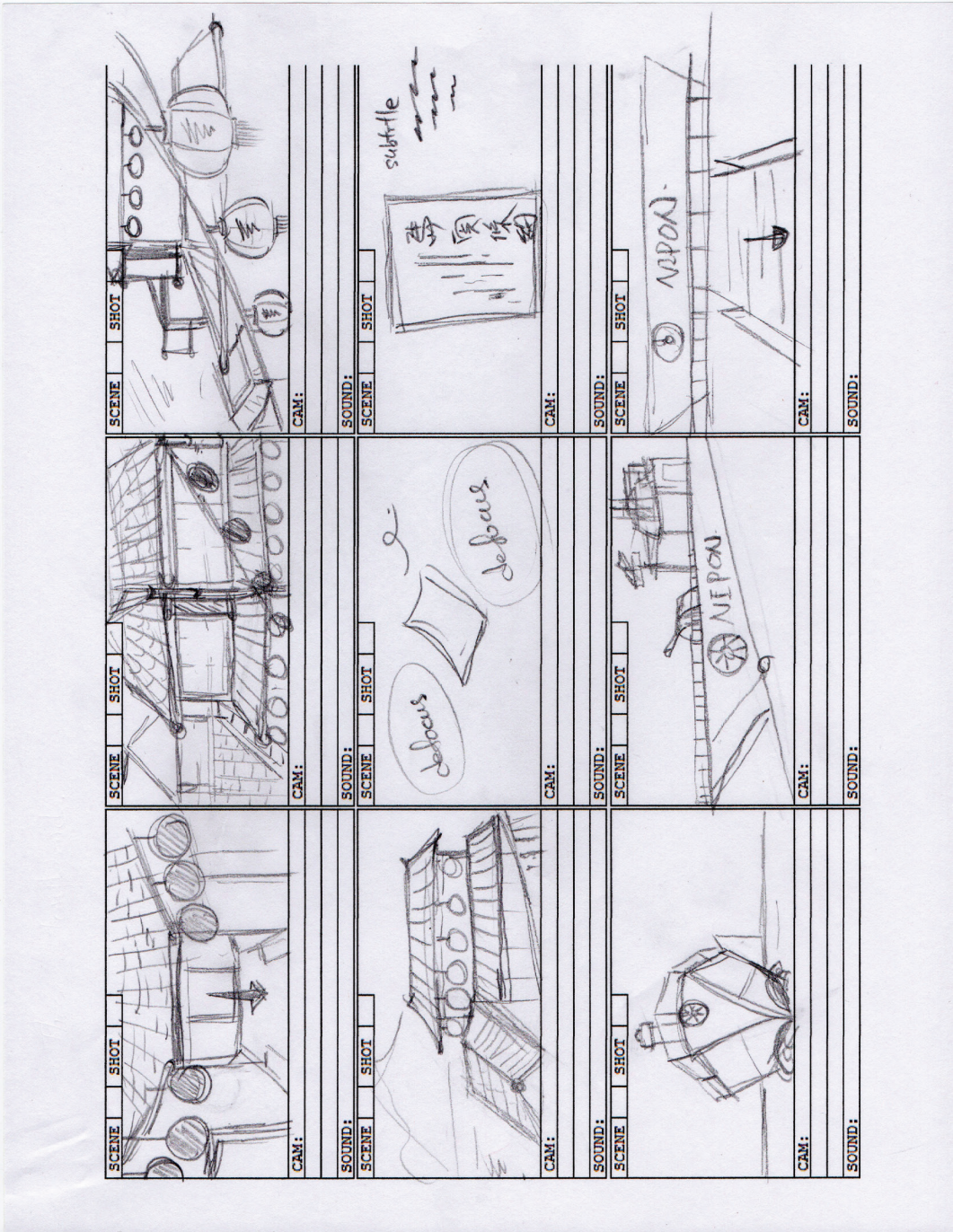
Design Ideation

Storyboard



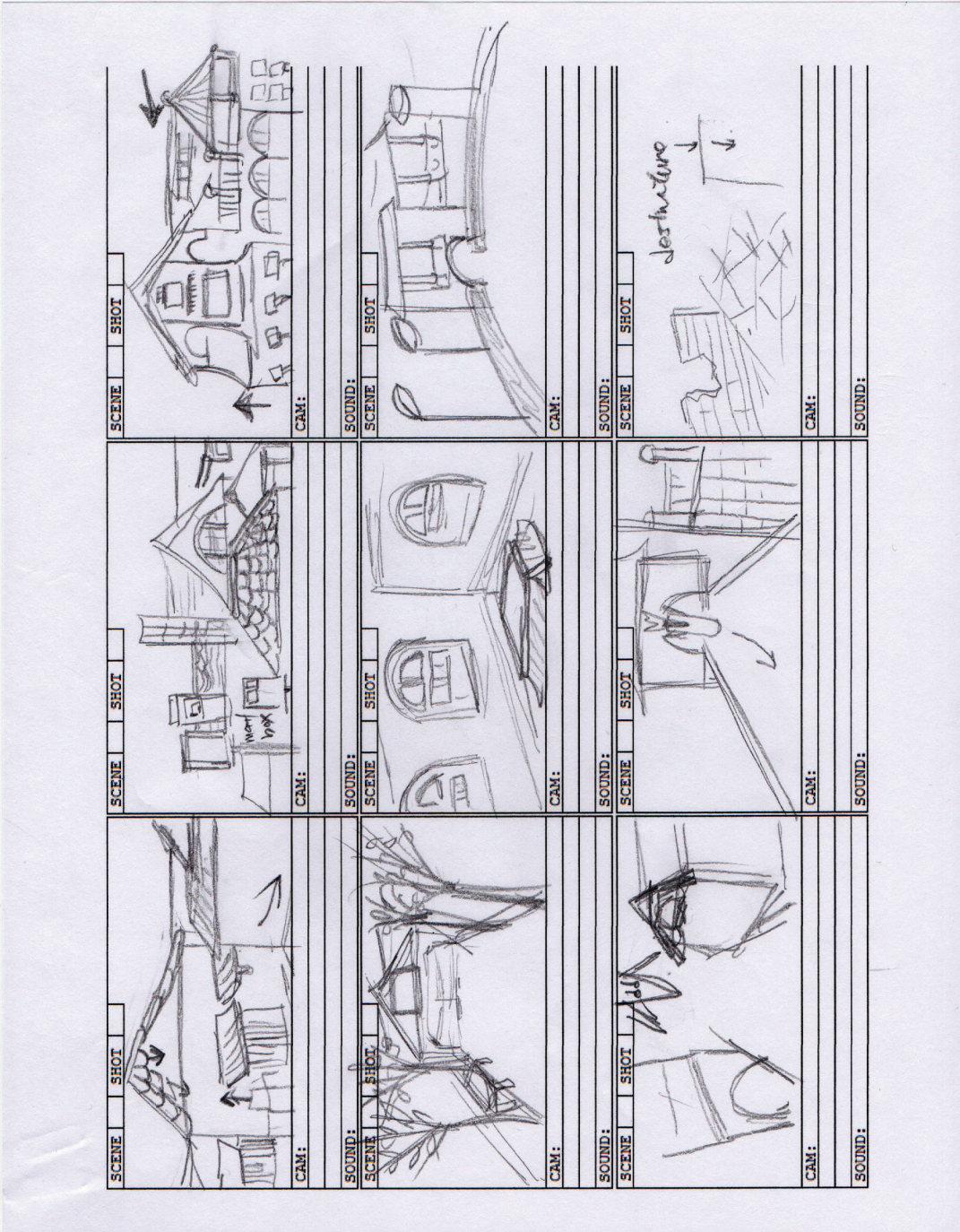
Design Ideation

Storyboard



Design Ideation

Storyboard



Methodological Design

Approach

My thesis project is going to be an 120 seconds 3D film showcasing the evolution of the architecture in Taiwan from 1894 –1945 and the aftermath of destruction during World War II. The main softwares I am using for this thesis project are Autodesk MAYA and Adobe After Effects.

Target Audience

Target Audience

Students in junior high and high school
Both female and males from the ages of 12–18 years old

Software

The main softwares I am using for this thesis project are Autodesk MAYA and Adobe After Effects.

Hardware

- Alienware Aurora-R4
- Canon ESO D600 - Rebel T4i
- Wacom Bamboo Create Pen and Touch Tablet - CTH670

Implementation Strategy

In creating a 3D film for the construction and destruction of Taiwan based on Sino-Japanese war and WWII, I will approach the project through a series of steps:

First of all I will travel back to Taiwan-Taipei during summer vacation. This will be the first of several visit for the field investigation which I will go through visual observation, collect data of the history and background, spot sketch of exterior/interior structure, ornament color and construction materials. The most important thing is I will collect the data of the original style of Taiwanese Spring break will be the second time I travel back to Taiwan if necessary, I will keep my written documentation with me for my further observation and store other relevant information about the buildings. Also working on comparing the traditional Taiwanese style and Japanese style architectures.

During my visit to Taiwan I will seek out individuals who are willing to be a point of contact for my interviews. Access to the original exterior/interior will be more challenging as some of the buildings are no longer exist or have been rebuilt to a modern style. Generation like our grand parents have been through the war can provide a clearer view than the documents show; also they will be more able to be in touch with and provide a proper help. Together with the available documentation, I will cross match the investigation then collect the information from both of them.

Once I have enough data for background information, the next phase will be to build a rough modeling for buildings in MAYA. Drawing upon the data collected, I will begin sketching the whole environment for the scene. I will collect the references and images for texturing then organize them for the difference scene and usage. Modeling, color and texture will be considered as the most important part at this step. 3D animation will be the way I show how the environment being changed and why our environment ended being destroyed.

After finishing the modeling and texturing parts, I will start applying effects for destruction and further atmosphere, trying many different options and compositing to make a better solution. Later on I will put on lights and secondary effects such as fog and clouds, revise the previous modeling part if necessary. I will continue to find tutorials for making a better visual effects.

Last but not the least, once I have the overall project done, I will start rendering some cameras out to see the result. I will begin applying the 2D effect and the final compositing in Aftereffects. At the final step I will try putting audio and applying opening sequence for my project.

Dissemination

My thesis project will be circulated through various outlets, including but not limited to:

- Imagine RIT
- YouTube
- Vimeo
- Sundance Film and Music Festival
- Reed.co.uk
- San Diego Film Festival 2015
- NYC Independent Film Fest
- Vancouver International Film Festival (VIFF)
- Sarasota Film Festival (SFF)
- National Palace Museum in Taiwan
- Gold Ecological Park Museum in Taiwan

Budget

Travel: \$2,300
Monitor: \$1,330
Desktop: \$3,030

Bibliography

- Youtube tutorial by Kerim Timirbulatov, “3D Fluid Effects in MAYA”, published 2014 ,
<https://www.youtube.com/watch?v=nQCDjGUxdu0>
- Youtube tutorial by Vfx Master, “Maya FX_Fastest Way To Create Realistic Fire in Maya 2017 “,
published in 2016, https://www.youtube.com/watch?v=r51Y_YzTmqI&t=132s
- Youtube tutorial by Action VFX, “CGI VFX Tutorial HD: Burning House Tutorial”, published 2016,
<https://www.youtube.com/watch?v=QfH8Qglnu8>
- Youtube tutorial by Action VFX, “How to Composite Atmospheric Smoke & Fog in After Effects ”,
published in 2017, <https://www.youtube.com/watch?v=DALMUI7-Apw>
- Youtube tutorial by Gaudencez, “Maya Tutorial: Replacing picture info with Smoke”, published in 2012,
<https://www.youtube.com/watch?v=TLZXpd55bKU>
- Youtube tutorial by V-Render4Future, “Maya nCloth Tree Animation + falling Leaves”, published in 2013,
<https://www.youtube.com/watch?v=kQgELWhUzxY&t=172s>
- Youtube tutorial by Vision Of Jeremiah, “Autodesk Maya nCloth Destruction tutorial”, published 2013,
<https://www.youtube.com/watch?v=BDQyu26v8H8&t=106s>
- Youtube tutorial by Gabriel Lapierre, “Quixel Basic DDO Texturing Tutorial”, published 2016,
<https://www.youtube.com/watch?v=fiaoFLmzYGI&t=348s>
- Youtube tutorial by KarmaKanadian, ”Making our own materials for Quixel’s dDo”, published 2015,
<https://www.youtube.com/watch?v=21AmEHLqBDc>
- Youtube tutorial by ZENGen Learning, “Color Grading Made Easy - After Effects Tutorial”
published 2016, <https://www.youtube.com/watch?v=usNAHKXzzjU&t=218s>
- Youtube tutorial by CREATRIX VISUALS, “Advanced Cinematic Color Grading Tutorial - DSLR
Filmmaking” published 2015, <https://www.youtube.com/watch?v=ir2TmoRDNHY>
- Image, Taiwanese old time architecture,
https://5.share.photo.xuite.net/yan9436/159745e/10614780/492077666_m.jpg

Bibliography

Digital image resources by textures.com, <https://www.textures.com/>

Sound effects resources by Freesound, <https://freesound.org/>

Animation “Spirited Away” published March 2003, Directed by Hayao Miyazaki and Kirk Wise
<http://www.imdb.com/title/tt0245429/>

Multiplayer Online Role-Playing Game “Age of Wulin” first published 2014 by Snail in China.
<http://www.9y.bfage.com/>

Documentary, Taipei Time “Taipei Air Raid: a forgotten tragedy “ published 2015 by Han Cheung
<http://www.taipeitimes.com/News/feat/archives/2015/06/07/2003620104>

Documentary, “Sino-Japanese War “ published 2016 by The Editors of Encyclopædia Britannica
<http://www.britannica.com/event/Sino-Japanese-War-1894-1895>

Research document, “The fortunate dimensions of Taiwanese traditional architecture “ published 1995
by SC Chiou, <http://repository.cmu.edu/cgi/viewcontent.cgi?article=1021&context=architecture>

Research document, “Great article on history of Taiwan’s architecture “ published 2005 by Roy Berman
<http://www.mutantfrog.com/2005/10/11/great-article-on-history-of-taiwans-architecture/>

Research document, “Culture of Taiwan - history, people, clothing, traditions “
<http://www.everyculture.com/Sa-Th/Taiwan.html>

Research article, “Buildings with Style “ published 2015 by Taiwan Time
<http://taiwantoday.tw/news.php?unit=20,20,29,35,35,45&post=26036>

Online journal, “The 10 Most Beautiful Places In Taiwan - Culture Trip “ published 2017 by Melissa Pearce,
<https://theculturetrip.com/asia/taiwan/articles/a-multicultural-history-top-ten-taiwan-sites/>